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ANIMAL HEALTH DIVISION ANNUAL REPORT 1988

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STAFF

DIRECTOR

T. L. CHURCH, B.S.A., D.V.M., M.Sc.

E. Shewchuk
N. Burroughs
E. Morley
S. Phillips
C. Belsey
R. June

PATHOLOGY BRANCH

N. NATION, B.Sc., D.V.M., M.V.Sc., Diplomate A.C.V.P.

A. M. Fahrion

Animal Disease Section

B. MORDEN, D.V.M., M.V.Sc.

D.W. MacDonald, D.V.M., M.Sc.
M. Kennedy, B.Sc., Ph.D.
A. Perry, D.V.M., M.V.Sc.
D. Bolingbroke, B.A., D.V.M., M.V.Sc.
S. Groom, D.V.M., M.Sc.
A. Thibodeau
C. Collett
D. Moraiko
C. Wright, A.H.T.
N. King

Poultry Disease Section

J. HANSON, B.Sc., D.V.M.

D. Onderka, D.V.M., M.Sc., Dip. Vet. Path.
D. Owens, A.H.T.
E. Wasylyshyn

Reproductive Section

C. KREPLIN, D.V.M., Ph.D.

V. Maitland, A.H.T.
S. Olchowy

Lethbridge Laboratory

W. N. HARRIES, B.V.M.S., M.Sc., M.R.C.V.S.

G. A. Chalmers, D.V.M., Dip. Vet. Path.
J. A. Wood, B.A.
D. Malchow
D. McCutcheon
R. Cassis, B.Sc.
S. Marshall, B.Sc.

Fairview Laboratory

J. HENDERSON, D.V.M.

B. O'Connor, M.V.B., M.R.C.V.S.
C. Kaip
K. Dies, Biol. Sc.
M. Bartholet

Airdrie Laboratory

N. LOWES, B.A., D.V.M., M.VSc.

S. Crowe, D.V.M., Dip. Vet. Path.
L. Bryan, D.V.M., M.Sc.
S. Lundberg, B.Sc., R.T.
K. Ursu
L. Becker
B. Silbernagel, A.H.T., R.T.
H. Sissons, A.H.T.
L. Sobbelov, A.H.T.
S. Leavitt
A. Mutalib

HEALTH MANAGEMENT BRANCH

R. SHUTE, D.V.M., Dip, Vet. Path.

J. R. Whittaker

Livestock Inspection

R. A. FENTON, D.V.M.

J. Pritchard, B.A., D.V.M.
J. Popowicz

Epidemiology

M. W. STONE, B.Sc., M.R.C.V.S., Dip. Vet. Med.

C. Schipper, D.V.M.
G.W. Ollis, D.V.M.
G. Finell, D.V.M.

MEAT HYGIENE BRANCH

G. W. SUMMERS, D.V.M.

T. Taylor
A. Duering

D. Morris
H. Kowalchuk
G. Ernshaw
E. Chudleigh
B. Stevens
D. Kahut
T. Ivins
G. McWilson
L. Leskosky
C. Wozniak
H. Falk
D. Schonheiter
L. Buchanan
R. Fleming

B. Morrison
H. Gross
H. Hyrve
R. Fullam
S. Soper
B. Benoit
R. Fyten
A. Guenther
P. Dac
R. Juuti
R. Boborsky
P. Boyson
D. Cameron
K. Brimacombe

R. Lowe
M. Willis
C.A. Banack
R. Ainsworth
O. Munchrath
R. Stephens
J. Alwood
W. Zapisocki
A. Clark
R. Halmrast
D. Banack
P. Morgan

REFERENCE LABORATORIES BRANCH

L. D. ARMSTRONG, D.V.M., M.V.Sc., Diplomate A.C.V.P.

P. Diduck
B. Birkholz

Virology-Serology

G. PAPP-VID, D.V.M., M.Sc., Ph.D.

J. Wu, B.Sc., M.Sc.
E. Ruzsicska, R.T.
T. Packer, B.Sc.

Bacteriology-Mycology

M. SCHOONDERWOERD, D.V.M., M.V.Sc.

S. Rawluk, B.Sc.
I. Lewis, A.H.T.
E. Bowlby
A. Wilson, R.T.
L. McFadzen, R.T.

K. Manninen, B.Sc.
L. Brown
B. Christian

Histopathology and Electron Microscopy Section

L. D. ARMSTRONG, D.V.M., M.V.Sc., Diplomate A.C.V.P.

G. Higgs, B.Sc., M.Sc.
M. Johnson, R.T.
D. Hansen, R.T.

Toxicology Section

B. E. BECK, D.V.M., Diplomate A.C.V.P.

R. Smith, B.Sc., Ph.D.
D.L. Lewis, B.Sc.
E. Stronski, B.Sc., M.Sc.
M. Fiedler, C.T.
G. Almadi, B.Sc.
C. Maxwell, C.E.T., A.C.I.C.
B. Taylor

ANIMAL HEALTH DIVISION

TERRY L. CHURCH, B.S.A., D.V.M., M.Sc.

ACTING DIRECTOR

The **Animal Health Division** through its programs and services, continued to enhance livestock production in Alberta by reducing the impact of disease. In addition to prevention and control of animal diseases, the division was involved with the protection and well-being of animals, contributing to a safe and wholesome food supply and protecting human health through detection of transmissible diseases.

Programs and services included a complete range of modern and up-to-date diagnostic laboratory services, on-farm disease investigations, livestock health programs, inspection of livestock and meat, consultation and information transfer relating to animal disease, prevention, and control.

Responsibility for the Meat Inspection Act, Livestock Diseases Act, Fur Farms Act, Animal Protection Act and Veterinary Profession Act remained with the division. Amendments to the Animal Protection Act were passed by the Legislature, however proclamation was withheld until accompanying regulations were approved. In addition, the fur farm regulations were amended.

A grant was provided to the Alberta Society for the Prevention of Cruelty to Animals to assist with the employment of six special constables to investigate complaints of cruelty, distress, and neglect of animals in accordance with the provisions of the Animal Protection Act.

A grant was given to the Veterinary Infectious Disease Organization in Saskatoon to support research in veterinary medicine.

The summer veterinary work experience program provided employment for 21 Alberta veterinary students on a cost-shared basis. Funding was slightly increased to provide maximum monthly reimbursement of $550, $600 and $650 respectively for students who completed their 1st, 2nd and 3rd year. The program was well received and provided a valuable opportunity for students to put classroom theory into practice.

The Edmonton Pathology Branch and Regional Veterinary Laboratories at Fairview, Airdrie and Lethbridge were managed as one branch to provide diagnostic service to veterinarians and animal owners, transfer of information, field investigations and research into diseases.

A research section was organized under the supervision of Dr. Murray Kennedy and a number of projects were initiated by branch staff. In addition, Alberta Agriculture's Interdisciplinary Research Unit was organized and projects were underway by year end.

A uniform method of investigating reproductive failure in cattle was developed. A kit was prepared for practitioners allowing them to submit a comprehensive package to investigate factors influencing fertility to the laboratory at one time.

The livestock population of Alberta continued to maintain an excellent standard of health and the province's livestock remained free of exotic disease. Neonatal diarrhea was a minor problem in central and southern regions and pneumonias in feedlot cattle and swine operations posed problems on individual farms. Salmonellosis was a

concern in several species this year causing disease in animals and, in occasional isolated cases, human infection. Although drought conditions were extensive in the southern half of the province, cattle remained relatively healthy. However, they did not show weight gains normally expected over the summer period.

The **Health Management Branch** continued to provide programs to control and prevent disease, livestock inspection and enforcement of regulations to control communicable diseases, and provide information transfer through branch veterinarians to private practitioners and animal owners.

All public livestock sales in Alberta were inspected by veterinary practitioners appointed by the department. The number of animals inspected increased again this year, although the rejection rate remained at similar levels. Inspection of licensed livestock medicine outlets was shared by branch members and a number of violations were found. Revisions to the livestock medicine regulations were completed and submitted for Cabinet approval.

Zoonoses on dairy farms was an important issue and a team approach involving the Health Management Branch, Dairy Branch, the producer and his veterinarian and Public Health authorities worked together to prevent the spread of infection. Successful elimination of the problem from the farm was achieved.

The Community Pasture Health program was privitized and the commercial section of the Swine Herd Health program was terminated. A high health category of seedstock producers was established as a pilot

project under the SHHP. The preconditioning program was modified to operate completely within the private sector.

Veterinary practices operating out of provincially owned veterinary clinics in Edson, High Prairie and Fairview remained strong and viable, whereas those at Valleyview, Manning and Fort Vermilion continued to required financial support to maintain a veterinarian.

A feedlot study involving two Calgary area feedlots was carried out to determine the prevalence of Haemophilus somnus infection in feedlots. The study confirmed the belief that this organism is of major significance as it was recovered from approximately 50 per cent of suspect cases.

The **Reference Laboratories Branch** was located in Edmonton and provided detection and analytical services in the specialized disciplines of bacteriology, virology-serology, toxicology, and electron microscopy-histology to identify a wide range of disease-causing organisms, toxins, and nutritional deficiencies causing production losses. Branch staff also provided consultation and field investigation services to help minimize the inefficiencies caused by animal diseases and ensure the viability of production units.

Vitamin A and E nutritional deficiencies were of primary concern to producers and veterinarians this year. A co-operative project with the University of Alberta was carried out in the veterinary toxicology laboratory to assess the influence of selenium and vitamin E on disease

resistance in feedlot cattle. Feed additives continued to be a leading cause of poisoning in farm livestock and an important source of residues in foods. Analyses for several common feed additives were added to the laboratory capacity which now total 26.

In the bacteriology section milk samples for mastitis diagnosis from dairy producers were submitted most frequently for testing and specimens almost doubled compared to the same period last year. An epidemic of mastitis due to an uncommon organism, Nocardia spp., occurred on 54 farms across Alberta.

The virology-serology lab experienced an upsurge in bovine virus diarrhea (BVD) diagnoses, particularly in reproductive failures and abortions. Potomac horse fever was recognized for the first time in Alberta and Porcine influenza virus was isolated for the first time.

The serology lab collaborated with the department of fish and wildlife to process and ship over 1400 elk blood samples to New Zealand for parentage testing to ensure purity of Alberta stocks.

The **Meat Hygiene Branch** continued its mandate of delivery of meat inspection services to abattoirs and secondary processors throughout the province. Administration of the Meat Inspection Act and regulations and investigations of alleged violations ensure a safe and wholesome meat supply for Albertans and foster expansion of the meat processing industry in rural areas of the province.

Inspections increased for all types of livestock with the exception of cattle where there was a slight decrease over last year.

The marked increase in hog slaughter was attributed to temporary labor difficulties in one of the major packing plants under federal inspection. Carcass condemnations remained relatively stable and indicated that there has been little change in disease levels in the province. Inspection was provided to two secondary processors at their request. They have enjoyed a marked increase in business and others are preparing to apply for inspection. Enforcement activities continued, most complaints were resolved by negotiation or issuing a warning concerning violations.

Reciprocal tours were arranged with Saskatchewan and federal authorities to examine the standards of construction and inspection employed in each province. This was the first step towards entering into discussion with neighboring provinces with the goal of developing interprovincial trade of provincially and federal domestically inspected meats.

Dr. Terry Church continued to serve as acting director on a development assignment.

PATHOLOGY AND REGIONAL LABORATORIES BRANCH

The activities of the Pathology and Regional Laboratories Branches in 1988 included routine diagnostic services for animal owners and their veterinarians, transfer of information to producers, and field investigations and applied research projects. These two branches were managed as one and were collectively known as the Pathology Branch.

Drought was a major concern of livestock producers, particularly in the spring and early summer in the southern half of the province. Despite this, range cattle in the south and east of Alberta remained healthy although they did not make normal weight gains on summer pasture. Fears of plant poisonings did not materialize. Pregnancy testing in the fall showed some reduction of pregnancy rates and late conceptions in cattle in the southeast.

A uniform method of investigating the cause of reproductive failure in cattle was developed this year. Two separate history questionnaires have been developed, one each for beef cow/calf operators and dairy farms. A kit was prepared and provided to practitioners. This allows them to submit a comprehensive package to investigate nutritional factors and bacterial, viral and parasitic diseases influencing fertility to the laboratory at one time. Furthermore, a standard procedure for postmortem examination

of fetuses has been developed and adopted by all Pathology Branch laboratories. This procedure provides a uniform approach across the province and will facilitate retrospective studies.

A research section was organized under the supervision of Dr. Murray Kennedy. This stimulated a number of projects on the part of Pathology Branch staff. In addition, the administrative arrangements and resource requirements for Alberta Agriculture's Interdisciplinary Research Unit were organized and the first projects in this unit were underway by the end of the year.

The Pathology Branch agreed to undertake publication of a Synopsis of Parasites of Vertebrates of Canada. Dr. Murray Kennedy was appointed as the editor of this synopsis. Twelve authors are each contributing a volume to the series which will take three to five years to complete.

1. Animal Section

In 1988, the Animal Section obtained full staff when Dr. Stephen Groom joined in March, and Dr. Dennis Bolingbroke in October. There was a moderate decrease in case load as a result of institution of submission fees. Major disease problems continued to be those of seasonal occurrence. Neonatal diarrhea occurred in calves in the spring, fibrinous and viral pneumonias in cattle in the fall, and pasteurella pneumonia in swine during periods of rapid temperature fluctuation.

Information transfer to producer groups was conducted by Dr. Byron Morden on neonatal diarrhea of calves, and by Dr. Stephen Groom on nervous conditions in cattle at the 16th Annual Alberta Cattle Feeders Feedlot School. Presentations to professional groups were also given by members of the Animal Section. Dr. Stephen Groom made three such presentations. One was made to the Peace River Veterinary Club and a paper entitled "Emerging Role of H. somnus in Previously Unreported Manifestations in Western Canada" was given at the American Bovine Practitioners Association meeting. Dr. Groom also presented a seminar to the VIDO group in Saskatoon on Molecular Biology, "Aspects of Haemophilus somnus". Dr. D.W. MacDonald gave a paper on "Hypoxic Lung Lesions in a Cat", at the Canadian Association of Veterinary Pathologists meeting in Saskatoon on July 8th. A number of presentations were also given at the Annual Western Conference of Veterinary Diagnostic Pathologists.

2. Poultry Section

The workload handled by the poultry section followed much the same pattern as in previous years. Dr. Hanson continued to develop the capabilities of the section in fish diagnostics. Dr. Onderka spent six months away from diagnostic duties conducting research on fox and chinchilla nutrition for the fur industry. He also took advantage of the time to prepare five scientific papers and initiate a

research project on fertility of male mink. Dr. Ahmed Mutalib replaced Dr. Onderka during this time, and in addition to performing diagnostic work conducted and published a study of perirenal hemorrhage in turkeys.

A number of layer flocks had production problems associated with Mycoplasmosis. Infectious bronchitis caused significant egg loss to one producer. Osteomalacia was often involved as a problem in small farm flocks.

Excessive numbers of small, runted chicks in several broiler flocks had producers questioning the presence of malabsorption syndrome. This was found occasionally but not in all cases of diarrhea and poor chicks.

Ascites continued to be a common problem in small flocks but the incidence was reduced in commercial barns.

3. Theriogenology Section

There were no serious outbreaks of infectious abortion in cattle during 1988. Causes of individual abortions differed from case to case and included various bacteria, Infectious Bovine Rhinotracheitis virus, Bovine Virus Diarrhea virus, Aspergillus sp, Mucor sp, insufficient placentation and other noninfectious causes. In sheep, the most common cause of multiple abortions was Chlamydia psittaci infection while porcine parvovirus was most frequently diagnosed in swine.

Reduced fertility and a higher percentage of open

cattle was observed in several beef herds in 1988. These usually came to the attention of the owner in the fall at pregnancy testing time, four to five months after the breeding season. The cause in most cases did not seem to be infectious. Often factors such as low selenium, copper or Vitamin A were implicated. The nutritional status of many beef cow/calf herds approaching the breeding season in 1988 may have been influenced by drought conditions earlier this year.

4. Research Section/Parasitology Lab

The research section was newly organized in 1988. It assumed responsibility for the Alberta Agriculture Interdisciplinary Research Unit, the animal holding facilities in the O.S. Longman Building, and the parasitology diagnostic service.

Seven hundred fifty specimens, representing 488 submissions were examined for parasites in 1988. Analysis of the specimens indicated that 32.5% positive for parasites. However, only 6.5% (41/640) of the specimens containing parasites, or a stage of the parasite (eg. eggs, oocysts, nits, etc.), contained pathogens or parasites in sufficient numbers to cause or contribute to disease.

5. Fairview Laboratory

The Fairview lab continues to develop as a veterinary extension resource for the Peace River region in addition to

its laboratory diagnostic and disease control function. Dr. Henderson presented several seminars to producer groups on such diverse topics as poultry flock health and calving management. The Fairview laboratory continued its role in assisting with the training of AHT students at Fairview College.

6. Airdrie Laboratory

The Airdrie laboratory went through a number of staff changes during the year. Dr. Lowes was appointed head of the laboratory in September. The disease patterns seen in this laboratory during the year were similar to those in the past despite the drought conditions in the first few months. A major project studying mortality in the broiler industry was initiated by Dr. Crowe.

7. Lethbridge Laboratory

Drought conditions were of major concern to producers and other clients of the Lethbridge laboratory in 1988. A number of news releases and interviews were made by laboratory staff. These covered a wide variety of topics but some were specifically directed at anticipated drought related problems such as water quality for livestock and the dangers of toxic plants on drought stricken pastures. Dr. Harries spent considerable time with the sheep industry serving as a source of disease management and prevention expertise.

Disease Trends

There were no significant serious health problems in the livestock population although there were some new trends occurring. The livestock population of Alberta continues to maintain an excellent standard of health.

1. Manifestation of Haemophilus somnus infection in cattle was particularly high in 1988. The most common form has been myocardial involvement, with both myocardial infarction and abscessation of the myocardium. In the latter instance, death from left sided heart failure eventually occurs. Haemophilus somnus was also isolated from numerous cases of broncho and fibrinous pneumonias. A few cases of infectious thromboembolic meningoencephalitis have been seen as well as a number of abortions in which there was evidence of arteritis in the placenta.

2. Bovine virus diarrhea infection was a significant problem in cattle in all regions, and particularly in the Peace River District. BVD was associated with many abortions in Alberta. In the Peace River country several animals died from mucosal disease and chronic virus diarrhea. In some herds losses were significant, including one herd where BVD appears to be the causative agent in a diarrhea problem in 1-3 month old calves for the second consecutive year. The significance of the bovine virus diarrhea virus in many animals from which it was isolated

is not well understood.

3. Neonatal diarrhea submissions were decreased largely due to good weather conditions: a mild winter and dry spring. These factors allowed more dispersal of cow/calf pairs and reduced stress on the animals, resulting in reduced transmission of scours producing agents.

4. The number of cases of interstitial pneumonia of calves appears to be increasing. Many of these pneumonias had bovine respiratory syncytial virus demonstrated on fluorescent antibody tests. In southern Alberta, the dry spring resulted in excessive dustiness in feedlots and in some areas where the nature of the soil led to a more severe problem, losses diagnosed as Atypical Interstitial Pneumonia were common. These losses stopped when June rain settled the dust. A laboratory investigation is attempting to relate this type of respiratory disease to dust inhalation.

5. The general health status of all segments of the poultry industry was good in 1988. Decreased barn densities due to lower quota levels resulted in better livability and no major infectious disease was widespread throughout the province. Sudden death syndrome and culling because of leg weakness problems were the most serious conditions in broiler barns. Losses of 6 to 8% from these two conditions occurred in many flocks. By year end, many producers were using a restricted lighting program and reporting reduced

mortality from these conditions.

6. Coliform septicemia, sometimes secondary to hemorrhagic enteritis, was the most significant turkey disease. On individual farms, heavy losses occurred from fowl cholera and eryseipelas infection. Perirenal hemorrhage syndrome and aspergillosis were common diagnoses in Alberta turkey flocks.

7. The sheep industry continued to gradually expand and, in general, disease problems were sporadic. Toxoplasmosis, an abortion disease which is rare in western Canada was diagnosed. Cats, which act as reservoir hosts for the organism, were active in the sheep barn and it is thought that spread had occurred through these animals.

8. Swine Influenza was diagnosed in seven hog operations. The outbreaks were typical of those described elsewhere in that almost all pigs on the premises showed depression and coughing for up to one week. They then recovered and there was negligible death loss.

9. Western Equine Encephalomyelitis was diagnosed in a horse which showed nervous signs and subsequently recovered. Two other suspected cases were reported in the same general area.

10. Salmonellosis was a concern in several species this year, both in producing animal disease and in certain isolated cases where humans were infected. The number of

cases of S. dublin decreased over 1987. S. typhimurium infection of a cat spread to a child. The same organism killed 30 of 32 week old dairy calves trucked in from British Columbia and spread to three in-contact children. Veterinary advice was not sought by the owner until most calves had died. Salmonella spp were also of concern in a number of outbreaks of omphalitis in chicks, prompting cleanup and control procedures in the hatcheries and on the affected farms. Salmonella enteritidis was recovered from the bulk milk tank on a dairy farm where this infection had occurred in calves and in-contact humans. The source of the infection was found to be one of the cows, which was shedding the organism in milk. Following removal of this animal, samples of bulk milk became consistently negative for salmonella organisms. The affected cow was brought to the veterinary laboratory at Lethbridge and her milk monitored for salmonella organisms prior to and following calving.

PATHOLOGY BRANCH PROJECTS 1988

1. Sheep Footrot

Investigators - Sharon Lundberg and Dr. Ray Fenton

The diagnosis of this provincially reportable condition is subject to several limitations: fluorescent reagents have been unavailable, interpretation of tests has been subjective and culture techniques are too slow for regulatory purposes. Initially, research centred on the improvement of fluorescent antibody techniques but this had to be abandoned due to a number of technical problems. Currently, an immunoperoxidase test is being developed. This technique has the advantages of being rapid, provides a permanent record and is more easy to quality control. The present plan aims to have the immunoperoxidase test available for diagnostic use in the fall of 1989.

2. A Prospective Study Assessing Laboratory Function

Investigator - Dr. Susan Crowe

Laboratory quality control and evaluation of laboratory function are ongoing concerns of the Pathology Branch. Dr. Crowe initiated a computer based study to assess laboratory functions such as the diagnosis rate, agreement between clinical and postmortem results,

frequency of a secondary condition being diagnosed, the efficiency of laboratory tests used to confirm diagnosis and days from submission to reporting. This project involved considerable computer programming and assessment of the types of information gathered on laboratory submission forms. It has resulted in a useful program which can be used to assess a number of areas of laboratory function. This project will be completed in 1989.

3. Eradication of Ovine Progressive Pneumonia (OPP)

Investigator - Dr. J. Henderson

O.P.P. causes premature culling of middle-aged and older ewes in the province of Alberta. In conjunction with Dr. Henderson, a Fairview producer obtained a Farming for the Future grant to develop a method of eradicating O.P.P. from his flock. Techniques being evaluated include a combination of serologic testing, synchronized lambing, use of lambing crates and cross-fostering ewe lambs to prevent colostral transfer of the infection. This is a multi-year project. Initial results indicate that proper application of the techniques studied can drastically reduce the incidence of O.P.P. in a flock.

4. Grazing Reserve Lungworm Study

Investigators - Dr. Brendan O'Connor and Ken Dies

A survey of the buildup and spread of lungworm infection in cattle was initiated in two community pastures in the Peace River region. The Baerman technique was employed to screen fecal samples collected from pastured animals. The project has demonstrated that a significant level of lungworm infection exists on pasture in the Peace region yearling cattle are primarily affected, and clinical infection becomes most severe in the early fall. The study will be extended for another year to observe the effects of anthelmintic treatment at pasture entry on the dynamics of parasite infection.

5. Broiler Hepatitis Study

Investigator - Dr. D. Onderka

Fibrosis of the liver causes considerable packing plant condemnation of broiler chickens in Alberta. A study was initiated to clarify the role of Clostridium perfringens toxin in development of this condition. The liver damage seen in the packing house was successfully reproduced in experimental birds using toxin from strains of Clostridium perfringens. The study is being written up for scientific publication.

6. Importance of Haemophilus somus in Commercial Feedlots

Investigators - Drs. Pritchard and Chalmers and Sharon Lundberg with Dr. Guichon (Feedlot Health Management Services Ltd.)

Haemophilus somnus is a major pathogen of cattle. The importance of disease produced by this organism in feedlots has not been fully assessed. This study, initiated by Dr. T. Guichon and Boehringer Ingelheim is intended to provide information about the diseases with which H. somnus is associated in feedlot animals and its economic impact. The study, encompassing 286 animals, demonstrated that Haemophilus somnus is a serious cause of economic loss in commercial feedlots, it is associated with or causes myocarditis, fibrinous pneumonia and arthritis in addition to classic thromboembolic meningoencephalitis.

7. Pasteurella Vaccine Feedlot Study

Investigator - Dr. G. Chalmers

A Lethbridge area practitioner requested laboratory assistance in conducting a controlled study of the efficacy of a commercial vaccine in reducing losses in feedlots due to Pasteurella hemolytica. The Lethbridge laboratory assisted by providing microbiological and histopathologic examination of lungs from cattle which

died during the study period. The study concluded that the vaccine in question did have an effect in reducing the morbidity and mortality due to this pathogen.

8. Epidemiology of Intestinal Parasites of Beef Cattle

Investigators - Drs. Kennedy and Chalmers with Meat Hygiene Branch Staff

Intestinal parasites of beef cattle are always a potential cause of economic loss. The buildup of pasture contamination by parasites in Alberta differs from other areas of the world due to climatic conditions. This has implications for managing and treating infected cattle. A one year study of the epidemiology of intestinal parasites in southern Alberta beef cattle was conducted using slaughter house specimens. Twelve species of nematodes were identified, eleven of which also occur in central and northern Alberta. The prevalence of nematodes in cattle in southern Alberta is similar to that in central and northern Alberta, but the dominant species differ. Ostertagia is the most prominent species in the south while Cooperia is most common in central and northern Alberta.

9. A Comparison of Three Anthelmintics in Parasite Control in Young Horses

Investigator - Dr. Murray Kennedy

Illness and death caused by parasites is most serious in young horses. A study was conducted to compare the effectiveness of three anthelmintics to control intestinal parasites in horses three to nine months of age. Fecal analysis was performed to quantify the numbers of Strongyle and Parascaris eggs per gram feces. The results indicate that fall and winter treatment is necessary to adequately control parasite infections and prevent contamination of spring and summer pastures. The treatment schedule will vary from treating every four to eight weeks depending on the anthelmintic chosen.

10. Thelazia Eyeworms in Cattle

Investigators - Dr. Murray Kennedy and Dave Moraiko

Thelazia species eyeworms in cattle may predispose the eye to diseases such as pinkeye. A two year study was undertaken to determine the species of eyeworms in Alberta and their role in the development of other diseases of the bovine eye. The study has found two species of eyeworms to be present in Alberta cattle. These are T. skrjabini and T. gulosa. T. skrjabini is

the most common. The life cycle of T. skrjabini has been worked out and the prevalence found to be approximately 20% of animals surveyed.

11. Parasite Survey of Wood Bison

Investigator - Ken Dies

The state of health of the Wood Bison population of the McKenzie Bison Sanctuary is a major concern. These animals are genetically pure and are free of certain diseases which are endemic in the bison population of Wood Buffalo National Park. A survey of the parasites of the McKenzie Wood Bison population was conducted at the Fairview lab. Ingesta was examined for adult Helminths, hides for external parasites, eyes for Thelazia and fecals of eggs and oocysts. The samples were relatively parasite free. Final results have yet to be compiled.

12. Broiler Mortality Survey

Investigator - Dr. S. Crowe

Commercial broiler producers have reported high mortality from various causes resulting in significant production losses. Dr. Crowe initiated a study to determine the cause of death and disease in a large commercial broiler farm representative of those

reporting difficulties. The objective was to collect data on mortality, to correlate these with various management and other factors and to communicate the results obtained to the industry. The study has demonstrated the value of the gross postmortem examination as a tool assisting the producer in making management changes to increase production. This project will be completed in the spring of 1989.

13. Chinchilla Feed Evaluation

Investigator - Dr. D. Onderka

At the request of the Alberta Chinchilla breeders, the Animal Health Division conducted a comparison of two types of locally made Chinchilla feed. One used local supplements while the second used supplements obtained from out of the country. Both feeds were found to be satisfactory for the furring period. The results of this study have been presented orally to the industry and a written presentation is also being prepared.

14. Fox Feed Evaluation

Investigatory - Dr. D. Onderka

At the request of the fox industry, a study was initiated to evaluate an Alberta prepared complete fox feed against a feed imported from the United States.

The study evaluated the feed in terms of suitability for the maintenance, gestation, lactation and furring. The Alberta produced feed was found to be satisfactory for all of these periods in the production cycle. The results of this study have been presented orally and will also be the subject of an article in a trade magazine.

15. A Study of Perirenal Hemorrhage Syndrome in Turkeys

Investigators - Drs. A. Mutalib and J. Hanson

Sudden death in rapidly growing turkeys associated with hemorrhage around the kidneys has become and increasingly important cause of losses in Alberta over the past few years. A study of the pathology and field cases submitted to the Poultry Section over the past five years was conducted. This was followed by a producer survey and visits to selected farms. The study found that perirenal hemorrhage syndrome is a disease of the more efficient flocks with the better rates of feed conversion and faster growing birds. Two publications are currently in press reporting the results of this study.

16. Coyote Disease Survey

Investigator - Dr. Lorraine Bryan

The park warden service of Banff National Park wished to obtain information on the condition of coyotes in that park. They also wished to determine whether rabies was present in the park coyote population. The Airdrie laboratory examined 21 road kill coyotes submitted over the course of the year by park wardens. The survey found that coyotes were generally in excellent condition. All coyotes examined were free of rabies.

PATHOLOGY BRANCH, PUBLICATIONS 1988

I Professional

a) Scientific articles

BRYAN, L. A., J. Griebel, M. Haines, W.C. Davis and J.R. Allen. 1988. Immunocytochemical Identification of Bovine Langerhans Cells by Use of a Monoclonal Antibody Directed Against Class II MHC Antigens. Journal of Histochemistry and Cytochemistry. 36: 991-995

KENNEDY, M.J. 1988. Synopsis of the Digenea of Mammals of North America. Alberta Agriculture Publication. Queen's Printer. 83 pp.

KENNEDY, M.J. 1988. Synopsis of the Parasites of Domesticated Mammals of Canada. Alberta Agriculture Publication. Queen's Printer. 53 pp.

KENNEDY, M.J. 1988. Trypanosoma theileri in cattle of central Alberta. Canadian Veterinary Journal 29: 937-938.

KENNEDY, M.J., D.R. Zobell. 1988. Evaluation of ivermectin on performance of beef cattle on pasture in Alberta. Canadian Veterinary Journal 29: 566-568.

MUTALIB, A. 1988. Epizootiology and pathology of avian tuberculosis in chickens in Saskatchewan. C.V.J. 29: 840-842.

OLSON, M.E., I. Goemans, D. Bolingbroke and S. Lundberg. 1988. Gangrenous dermatitis caused by Corynebacterium ulcerans in Richardson ground squirrels. J.A.V.M.A. 193: 367-368.

ONDERKA, D.K. 1988. Experimental contact transmission of Pasteurella hemolytica from clinically normal domestic sheep causing pneumonia in Rocky Mountain Bighorn Sheep. J. Wildl. Dis. 24: 663-667.

ONDERKA, D.K. 1988. Susceptibility of Rocky Mountain Bighorn Sheep and Domestic Sheep to Pneumonia Induced by Bighorn and Domestic Livestock Strains of Pasteurella hemolytica. Can.J.Vet.Res. 52: 439-444.

ONDERKA, D.K. 1988. Use of Equine Gonadotrophin in female Mink. Theriogenology 28: 667-674.

PERRY, A.W. and D.W. Schlingman. 1988. Pneumonia associated with eugonic fermenter-4 bacteria in two Chinese Leopard cats. Can.Vet.J. 29: 921-922.

b) Cross Canada Disease Report - Canadian Veterinary Journal

- Monensin Toxicity in Dogs - Dr. Chalmers (May)

- Hereford Syndrome I - Dr. Chalmers and Mr. L. Rockenbach (August)

- Ascarid Larval Pneumonia in Pigs - Dr. Harries (July)

- Placentitis due to Salmonella hadar - Drs. Schoonderwoerd and Kreplin (July)

- Fowl cholera in overwintering mallards - Dr. Bolingbroke and Mr. Bjorge. (August)

- Fatal Dietary Embalance in Horses -
  Drs. Henderson and O'Connor (November)

II Extension

A) AGRINEWS

- Locoweed poisoning in Livestock - Dr. Chalmers
- Water Quality for Livestock - Dr. Chalmers

b) SHEEP FOOTNOTES

- Pinkeye in Sheep (Vol. 11, Oct 1988) -
  Dr Harries
- Scouring in Newborn Lambs - Prevention is Better
  Than Cure - (Vol. 11, Dec 1988) - Dr. Harries

c) Manual for Alberta Veterinary Practitioners. 1988.
Updated by Dr. Don MacDonald

III Lay Press

KENNEDY, M.J. 1988. Pasture, A 'clean' opportunity to study intestinal parasites. The Hayshaker 12: 11-13.

IV Other*

Charting parasites in Alberta pastures. Cattlemen: May 1988. pp 26

Parasite control on pasture. Alberta Farm Magazine: July 1988. pp 9, 12.

* These papers were not written by Dr. Kennedy but are based on interviews with him.

MEAT HYGIENE BRANCH

The Meat Hygiene Branch of Alberta Agriculture was responsible for the administration of the Meat Inspection Act and Regulations, including the delivery of the meat inspection service to abattoirs and some secondary processors, and investigation of alleged violations. The Act is intended to ensure a safe and wholesome meat supply for the citizens of Alberta and to foster expansion of the meat processing industry in rural areas of the province.

During 1988 the Meat Hygiene Branch employed two supervisors, two clerk typists, six working supervisors and 40 inspectors on a full-time basis. 19 inspectors and 148 veterinarians were employed on a part-time basis.

Inspection was provided to 76 red meat plants and 91 poultry plants including 83 operated by Hutterite colonies. Livestock inspected during the year were as follows with the percentage change indicated in brackets: Cattle 34,844 (-3%); hogs 138,038 (+29%); sheep 7,445 (+26%); goats 1,148 (+15%); buffalo 80 (+22%); rabbits 11,112 (+30%); broilers 2,832,718 (+5%); fowl 245,391 (+2%), and turkeys, ducks, geese and pheasants 121,780 (-11%).

An estimated 45% of the cattle and 10% of the hogs were custom slaughtered, but at least half of this amount was subsequently sold by the producer. Negligible amounts of other species were custom slaughtered.

The marked increase in hog slaughter appeared to be attributable to the temporary labour difficulties in one of the major packing plants. The abattoir industry may or may not be able to retain this segment of the market.

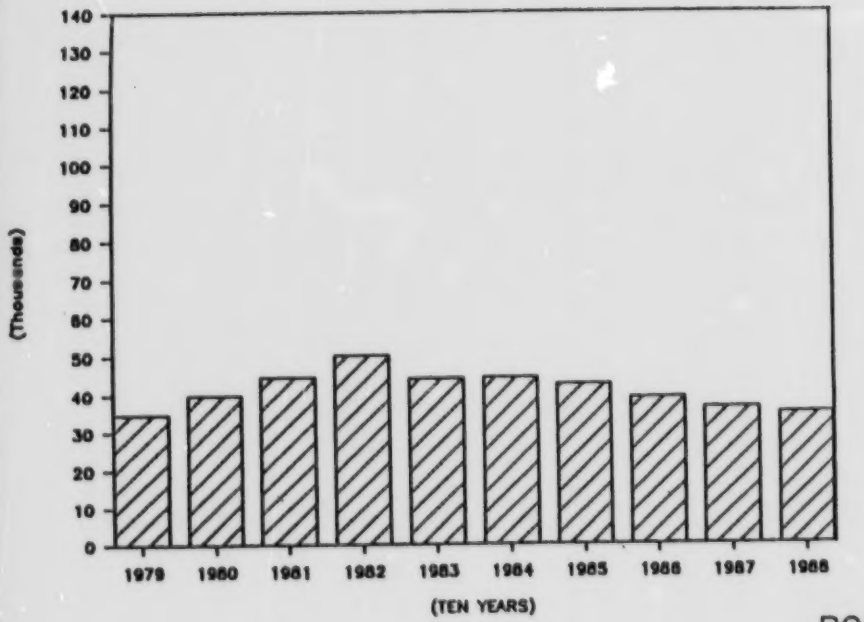
Carcass condemnations for the year remained relatively stable from previous years and would indicate that there has been little change in the major disease patterns in the province.

Enforcement activities continued during the year with approximately 80 complaints being received with 20 of these meriting further investigation. Most of the complaints could be resolved by negotiation or issuing a warning concerning violations. At the end of the year five investigations were still ongoing including one second offence for the sale of uninspected product. One individual was convicted for the second time of operating an abattoir without a licence, one individual was convicted of selling uninspected turkeys and one licenced abattoir was convicted of carrying out slaughter without inspection.

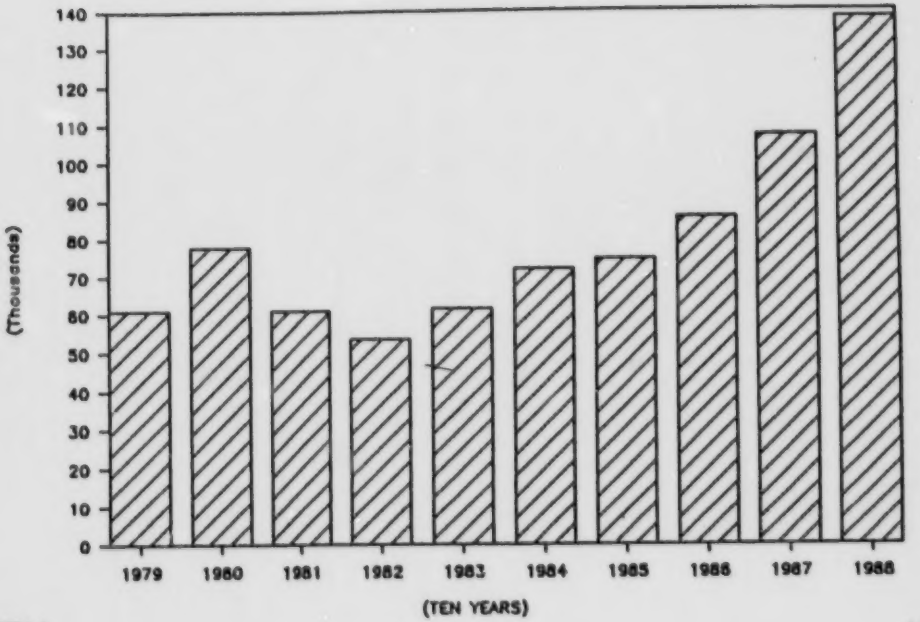
Considerable time was spent in developing regulations which would allow for the inspection of secondary meat processors either under the Meat Inspection Act or the Public Health Act. This will allow these processors to penetrate some of the major markets which up to now have not been open to them. In the meantime two of these processors have been provided inspection under an exemption and have enjoyed a marked increase in business as a result. A number of others are preparing to apply to come under the program.

At the end of 1988 there were 83 mobile butchers registered, although only 14 were active. Mobile butchers reported slaughter of 1,055 cattle, 404 hogs and 35 sheep. These animals were not inspected and the Regulations require that the meat from animals slaughtered by mobile butchers be consumed on the farm on which the slaughter took place.

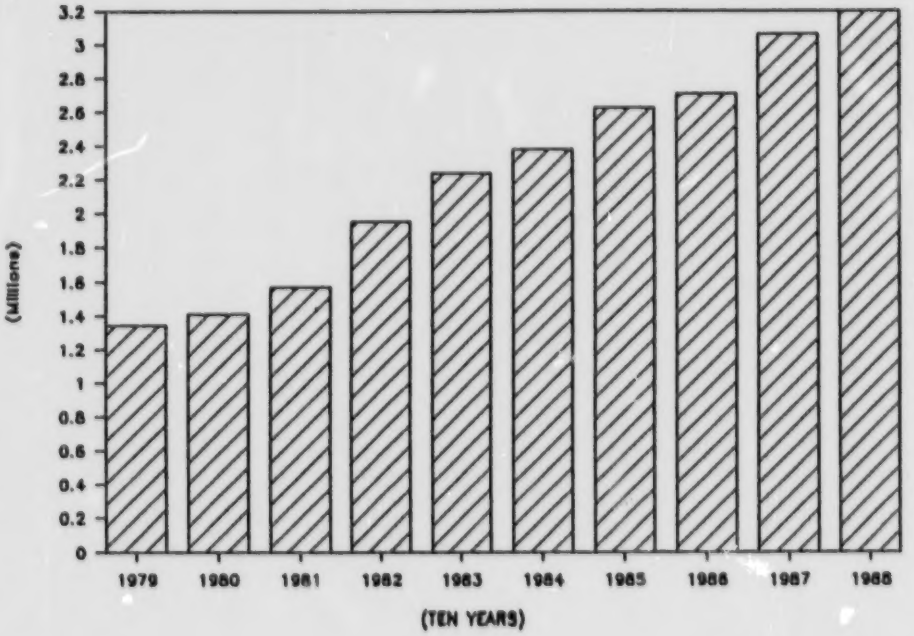
CATTLE



HOGS



POULTRY



HEALTH MANAGEMENT BRANCH

The prevention and control of disease in livestock herds, the administration of animal health programs, the protection of human health by control of designated diseases and enforcement of the Livestock Diseases Act were major responsibilities of the Health Management Branch in 1988. Techniques for disease prevention and improved production to enhance the viability of animal production were emphasized to livestock producers and veterinarians. Private veterinarians were a key link in providing information and services to producers, with over 150 veterinarians participating in the various programs.

Services provided by the branch included the seedstock portion of the swine herd health program, auction inspection program, northern veterinary clinics program, and field assistance provided to veterinarians and animal owners in the diagnosis and control of unusual disease problems. Transfer of technology was provided both directly, via branch staff, and indirectly through practicing veterinarians.

The commercial section of the swine herd health program was terminated. Practicing veterinarians are being encouraged to participate directly with producers. Dr. Finell is developing day long seminars for

veterinarians dealing with all aspects of swine herd health. A high health category of seedstock producers was established as a pilot project to encourage higher health standards in herds supplying breeding stock.

The community pasture health program was privatized. Most grazing reserve associations recognized the value of veterinary inspection at pasture entry and employed local veterinarians to continue on with the services. The health management branch veterinarians remain available for consultation where abnormal disease problems are encountered.

The Health Management Branch was responsible for the enforcement of various acts and regulations. The provisions of the Livestock Diseases Act, including the Auction Market Regulation, Designated Diseases Regulation, Assembly Station Regulation, Disposal of Dead Animals Regulation, Sheep Foot Rot Regulation, Livestock Medicine Regulation were enforced. The Fur Farms Act and regulation and the Animal Protection Act were administered.

A system was devised to deal effectively with zoonoses on dairy farms. The health management branch and dairy branch of Alberta Agriculture, the producer, his veterinarian and public health authorities dealt with the problem as a team. The objective was to prevent the spread of infection from animal to animal, animal to man and in some cases man to animal. Zoonotic infections

were discovered either from animals with disease, infected humans or from routine monitoring of bulk tank milk samples. Salmonella and Listeria were the only two organisms dealt with. In all cases, the producer was informed of his responsibilities to prevent transmission of the organisms. Pasteurization of all milk intended for household use and sanitation around the dairy were consistently recommended. Follow-up monitoring indicated successful elimination of the problem from all affected dairies.

ARDA Veterinary Clinics

Veterinary service continued from the six ARDA veterinary clinics in Alberta. The clinics at Edson, High Prairie, and Fairview continued to be strong and viable practices. Additional income support was required at Valleyview, Manning, and Fort Vermilion in order to retain practitioners in these areas. All clinics are presently occupied by veterinary practitioners.

Preconditioning Program

The preconditioning program was modified to operate completely within the private sector. The advisory committee recommended the return of the pre-immunized calf option to appeal to a broader range of buyers. A total of 7218 calves were health prepared (preimmunized or preconditioned) and sold in 1988.

A limited survey of cow-calf producers, veterinarians, feedlot operators and auction market operators revealed a variety of opinions and expectations of health prepared calves.

In summary, the benefits gained from preconditioning in terms of heavier calves, efficient rates of gain, better pasture utilization and improved cow reproductive performance are far less prominent in the minds of primary calf producers than are sale price premiums. Most large feedlot operators are unwilling to pay premium prices for health prepared calves. Those who utilize the concepts of health preparation prefer to make their own private arrangements and buy calves directly from producers, thus gaining another health advantage. Many feedlot operators feel they do not maximize profit from health prepared calves and they are unwilling to pay premium prices. Until the demand for health prepared calves out-paces the supply, cow-calf producers cannot expect price premiums.

Research Projects

The Bovine Respiratory Disease Project, funded by Farming for the Future, was completed in 1987. The objective of the study was to determine the risk factors which are associated with the development of respiratory disease in feedlot cattle in Alberta. Dr. Susan Wilson continued work on final analyses and will be reporting the findings early in 1989.

EPIDEMIOLOGY SECTION

The responsibilities of the Epidemiology Section included the administration of the Livestock Medicine Regulation, the Designated Communicable Disease Regulation and the Disposal of Dead Animals Regulation. In addition, assembling information regarding disease prevalence in food producing animals, participating in and supporting the transfer of information, conducting detailed investigations of unusual disease problems in the field and administration of the Swine Herd Health Program were all areas of the Section's activities. Veterinary practitioners continued to play a major role in the operation of the Swine Herd Health Program and occasionally participated in local extension activities or conducted disease investigations on our behalf.

Dr. Garry Finell commenced duties as swine veterinarian at the beginning of January to replace Dr. Schipper who five months previously had transferred to the newly created position of beef cattle veterinarian. At the same time, the former position of cattle veterinarian had been split into beef and dairy cattle positions, the latter being occupied by Dr. Ollis.

Epidemiology and Communicable Diseases

A broad surveillance of disease occurrence in food

producing animals was again maintained by monitoring various laboratory and Health Management Branch reports and by means of computer searches. More detailed information was obtained for diseases of particular interest to the branch, and particularly those named in the Designated Communicable Disease Regulation. The following table shows the number of positive diagnoses for each of these diseases for 1988.

Cattle		Swine	
Leptospirosis	1	Leptospirosis	0
Salmonellosis	27	Salmonellosis	0
Sheep		**Poultry**	
Brucella ovis	0	ILT	8
Footrot	28	Salmonellosis	15

In each case, appropriate action was taken to control the outbreak and to prevent it's spread to other premises and/or humans.

Although the number of diagnoses of salmonellosis in cattle remained high in 1988, the number of cases due to Salmonella dublin declined. More than half of the salmonellosis cases were in young dairy type calves

purchased at auction markets and many of these were hauled long distances from out-of-province. In one case, a dairy cow was found to be shedding Salmonella organisms in her milk. Several family members and others drinking raw milk on the farm developed clinical salmonellosis.

The increase in numbers of flocks quarantined for sheep footrot was in large part due to an outbreak on a community pasture in northern Alberta in the summer. This resulted in 22 flocks being quarantined at the end of the grazing season.

Information Transfer

The provision of information on animal diseases and management techniques to livestock producers and veterinarians continues to be an important role of the branch. The latter are kept regularly informed by means of the Animal Health Division newsletter which is distributed on a monthly basis to all large animal veterinary clinics throughout the province and to livestock specialists within the department.

Presentations to groups of producers were made on 34 occasions and to professional colleagues or groups of students on 13 occasions. Sixteen presentations related to beef cattle, seven to dairy cattle, 11 to swine and three to sheep. Other presentations described the role of the branch or branch programs.

The health column in the Western Hog Journal continued to be a regular feature. Other articles were written for Cattlemen's Magazine, Sheep Footnotes and Agri-News. Several new factsheets were written and a number of those contained in the Pork Production Handbook were revised.

A number of telephone interviews were given for either newspaper articles or radio broadcast. In addition to participating in the production of a film on dairy reproduction, part of the script was also written by the branch.

Further additions were made to the branch scientific library.

Disease Investigations

In-depth investigation of disease problems was carried out by the dairy, beef and swine veterinarians on 26 occasions. Many of these were at the request of the veterinary practitioner who was seeking help with a problem, although two were initiated by the branch following a diagnosis of salmonellosis. In one of these cases, Salmonella dublin was involved. Because of the significance of Salmonella organisms, farm visits were made to ensure that adequate precautions were taken to prevent spread and human infection.

Twenty-two investigations involved either beef or dairy cattle. Calf scours, mineral deficiencies and

respiratory diseases were the most frequently encountered problems in beef cattle; mastitis and reproductive problems were most common in dairy cattle. Poor growth rates, respiratory problems and suboptimal reproductive performance were the most common problems seen in swine herds. Most of these were directly related to management short comings.

A complete record of all disease investigations carried out by veterinarians in the Animal Health Division was received, correlated and filed.

Swine Herd Health Program

Enrollment in the program declined dramatically in 1988 due to termination of the commercial section on April 1st. The number of seedstock herds remained at about the same level as in the previous year. A number of these herds, however, did apply for admission into the newly proposed high health category.

The advisory committee met in April when it was agreed that implementation of the high health category should proceed, initially for a 12 month period. In addition, a subcommittee was appointed to review the outline of this category and their recommendations are to be discussed at the 1989 meeting. With the assistance of a S.T.E.P. student, Dr. Finell collected blood samples from over 900 animals representing 18 herds which had applied for the high health category.

Progress towards the unification of high health criteria across western Canada was delayed in view of the move by Agriculture Canada to set up a national swine herd health policy for Canada. Dr. Finell was appointed western representative on a steering committee which has the task of developing a formal program.

The use of veterinary practitioners declined considerably with the termination of the commercial section. A survey of mixed veterinary practices completed during the year indicated that many veterinarians are anxious to increase their swine knowledge and to provide a service for such clients. To assist them in this regard, regional meetings are planned to include an update on all aspects of swine production. No herd was debarred from test station use during the year because of disease problems.

Submissions of dead pigs to the veterinary laboratories from enrolled herds increased substantially in 1988. A good overall health status continues to be enjoyed by most herds, but nevertheless a variety of disease conditions were seen during the year. Gastrointestinal and respiratory problems continue to be the major ones encountered and included *E. coli* enteritis, intestinal adenomatosis, gastric ulcers, intestinal torsions, bronchopneumonia, enzootic pneumonia and pleuropneumonia caused by *Actinobacillus pleuropneumoniae*.

Head and lung examinations were continued on a twice monthly basis in a Red Deer packing plant until the end of July when an industrial dispute closed the plant for the remainder of the year. Nevertheless, there was an increase in the number of heads and lungs scored compared with 1987. The average score for those herds which have applied for admission to the high health category are shown separately in the accompanying table and this accounts for the increase in snout and lung scores for the seedstock herds.

Livestock Medicines

Following a review of the various public responses to the proposed changes to the Livestock Medicine Regulations, the final proposal was forwarded to the Minister for approval at the end of the year.

Inspections of licenced premises were shared by members of the branch. The most frequent violation was offering outdated products for sale which was found on about 40% of inspections. The second most frequent violation was the presence of restricted products including, occasionally, prescription drugs. Two hundred and ninety-four outlets were licenced in 1988. The licences in respect of eight premises were not renewed as they were not meeting the requirements of the regulations.

Summary of SHHP Activities

	1987	1988
Number of Seedstock Herds	54	39
Number of Commercial Herds	170	n/a
Number of High Health Herds (potentially)	0	18
TOTALS	224	57
Number Herds Added to Program	53	10
Number Herds Deleted from Program	49	7
Number Herds Visited - HMB Staff	75	87
Number Herds Visited - Practitioners	439	113
Number Snouts Scored for Turbinate Atrophy	1238	1693
Overall Mean Snout Score (Scale 0 = no atrophy, 5 = severe atrophy)		
- Seedstock	0.38	0.65
- High Health	n/a	0.21
Number Lungs Scored for pneumonic lesions	1613	2016
Average Mean Lung Score (expressed as a percentage of lung involvement)		
- Seedstock	1.45	2.12
- High Health	n/a	0.27

N.B. 1987 figures include scores for both conventional seedstock and current high health herds.

LIVESTOCK INSPECTION SECTION

The Livestock Inspection Section (Animal Health Division) has always had a strong mandate to work cooperatively and jointly with the private sector. Most of the activity of the section involves working with producers, veterinarians, feed companies, auction markets, other agricultural services industries, as well as, other government agencies.

Problem Solving Role in Food Animal Production

A major role of the Livestock Inspection Section is that of providing expertise in diagnosing and controlling conditions that adversely affect the health and production of food producing animals. Seventy-two investigations were conducted during this report period. Dairy, cow-calf, feedlot, horse, sheep and goat operations were involved. In many cases, financial loss to those producers was minimized and methods were identified to avoid similar calamities in the future. Recognition of two emerging diseases resulted from these investigations (Potomac Horse Fever/ verotoxin producing *E. coli* infection in calves). Zoonotic disease outbreaks in dairy and calf-rearing operations were contained and monitored.

Thirty-five sheep flocks were placed under quarantine, in accordance with the sheep footrot regulations. Twelve flocks were taken off quarantine

following eradication of the disease in their flocks. A series of informative articles on the control and eradication of sheep footrot were written for Sheep Footnotes, a producer magazine.

Extension

Problem solving investigations conducted by the Animal Health Division have a very positive spin-off effect: by involving the veterinary practitioner, he becomes well informed of the producer's problem and well acquainted with input from the Animal Health Division. He is then able to more effectively deal not only with that case, but similar ones which may arise in the future. Current information on livestock diseases and their prevention is disseminated out to livestock producers by this multiplier method. Written reports on each investigation provides a library of current knowledge for the producer and practitioner to draw on. Summaries of these reports are also circulated to other private veterinary practitioners, veterinarians employed by government and agrologists employed by Alberta Agriculture.

Section veterinarians often speak at producer meetings and on radio programs, as well as contribute articles for publication in producer oriented magazines.

Livestock Markets

Livestock inspection is conducted at all public livestock sales in the province by private practitioners appointed as inspectors under the Alberta Livestock Diseases Act. These veterinary inspectors are employed by the Animal Health Division on a fee-for-service basis. Animals identified with infectious diseases and/or in distress are marked and prevented from going for unconditional sale. Under-age livestock are rejected from the sale and directed back to the contributor's premises. Suffering livestock are directed to immediate slaughter or euthanasia, depending on each situation.

During 1988, inspection was provided at 51 livestock markets licenced for an unlimited number of sales, and at 18 markets licenced for a restricted number of sales. During this period, 2,061,766 animals were inspected, an increase of 92,309 animals (up 4.7%) from 1987 (1,969,457).

Swine accounted for 75% of the increased numbers and cattle 23%. Cattle accounted for 81% of all livestock inspected, swine 17%, sheep 1%, horses 0.8% and goats 0.2%.

In spite of the increase in numbers of animals inspected, costs were up only slightly which reflects a favorable increase in overall efficiency of inspection.

Livestock Assembly Stations

There were 51 assembly stations licenced in 1988. These stations are located throughout the province, serving as common holding yards where livestock is assembled for transport to slaughter. Licencing is required annually. Before being licenced, stations must have suitable facilities for yarding livestock. Shelter, pen space, pen conditions and safety for animals and humans are all taken into consideration before licences are issued.

Special Projects

A project was undertaken in the winter of 1988 to trace baby calves through four livestock markets in Alberta, and assess post-sale mortality rates. Approximately 500 calves were surveyed. Mortality was 11.7% by 30 days post-sale. The most common postmortem diagnosis was pneumonia, followed by diarrhea, then starvation. British Columbia source calves were at 2.3 times higher risk of dying than Alberta source calves.

A project was undertaken in the fall of 1988, to assess the impact of Haemophilus somnus infection in Western Canada feedlots.

Sheep footrot is a quarantineable disease in Alberta and of major concern to the sheep industry. In collaboration with Airdrie Veterinary laboratory staff, we initiated a project in late 1987 to develop a more

definitive laboratory test to positively identify the sheep footrot organism. A culture technique and fluorescent antibody staining technique were found to be unreliable. We are presently testing an immunoperoxidase stain identification method.

We facilitated a pre-immunization field study conducted by the Western College of Veterinary Medicine, using a commercial bovine respiratory syncytial virus vaccine. The objective was to determine the efficacy of the vaccine in reducing the occurrence of pneumonia in 625 weaned calves from one ranch. Results indicated a significant benefit by using the vaccine on calves sent to a bull test station. Results were inconclusive in trial calves which were kept at the home ranch and which wnet to a large feedlot. This was due to a very low rate of bovine respiratory disease at both locations. Consequently, the trial calves were not presented with a natural challenge since very little pneumonia (shipping fever) was present during the test period.

A copper-selenium response trial in several beef herds was conducted in conjunction with a private veterinary clinic, the local district agriculturist, the regional livestock specialist, and the herd owners. Results were inconclusive, however, the study resulted in the producers becoming much more knowledgeable about nutrition and its effects on the health and productivity

of their livestock. This project will continue in 1989 without our direct participation.

1988

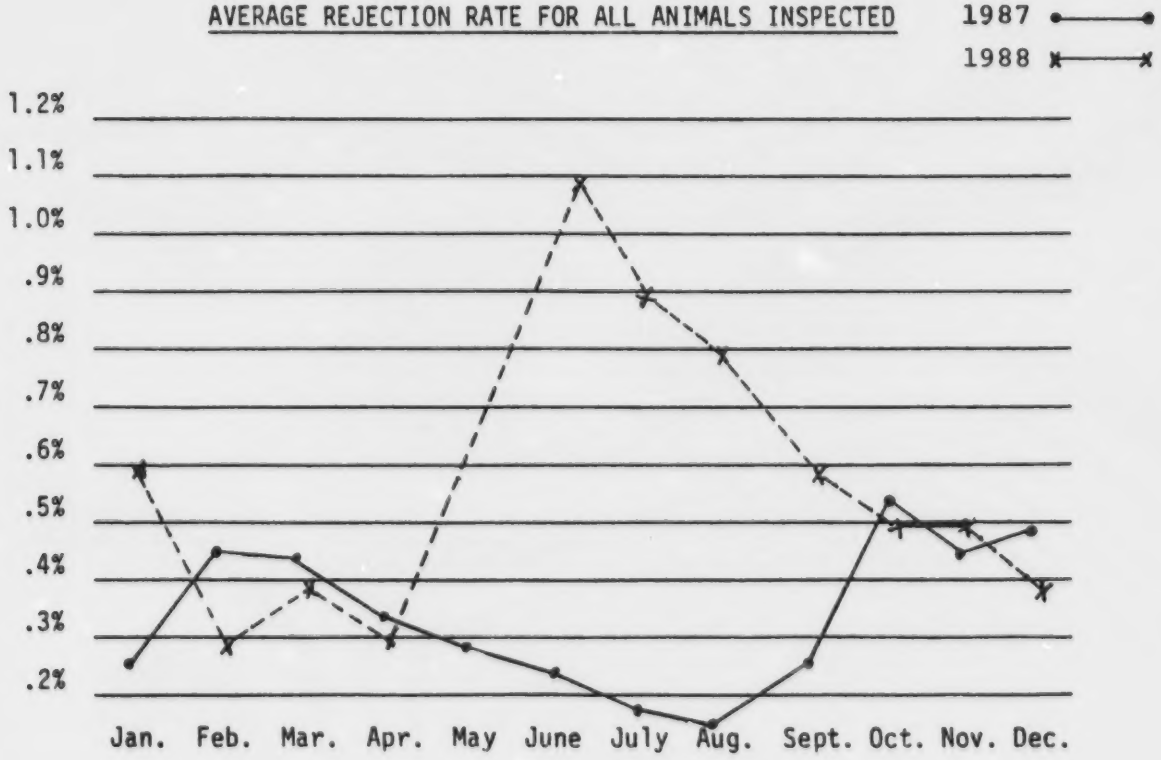
SUMMARY OF RESULTS OF VETERINARY INSPECTION

No. of Auction Markets - 51 Unlimited Licenced Markets
18 Limited Licenced Markets

No. of Sales 3,333

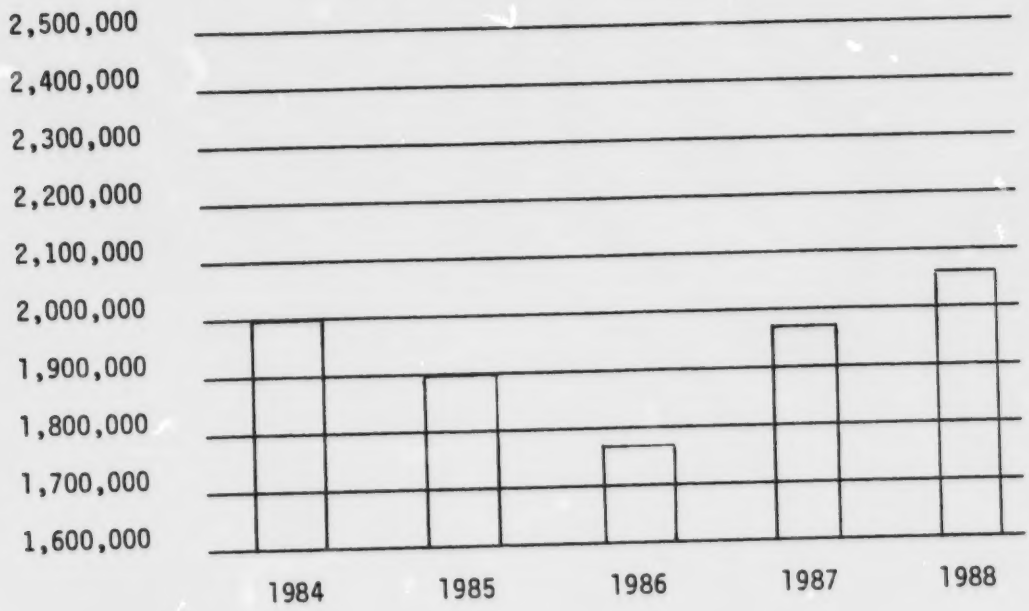
	Inspected In 1988	Percentage Of 1987	Rejected At Sales		Slaughter Only Animals	
			No.	%	No.	%
Cattle	1,669,417	101.3	1989	.12	3608	.22
Swine	348,557	125.4	4134	1.19	390	.11
Horses	16,801	96.8	76	.45	30	.18
Sheep	22,395	102.8	31	.14	528	2.36
Goats	4,596	100.9	13	.28	1	.02
TOTALS	2,061,766	104.6	6243	.30	4557	.22

AVERAGE REJECTION RATE FOR ALL ANIMALS INSPECTED

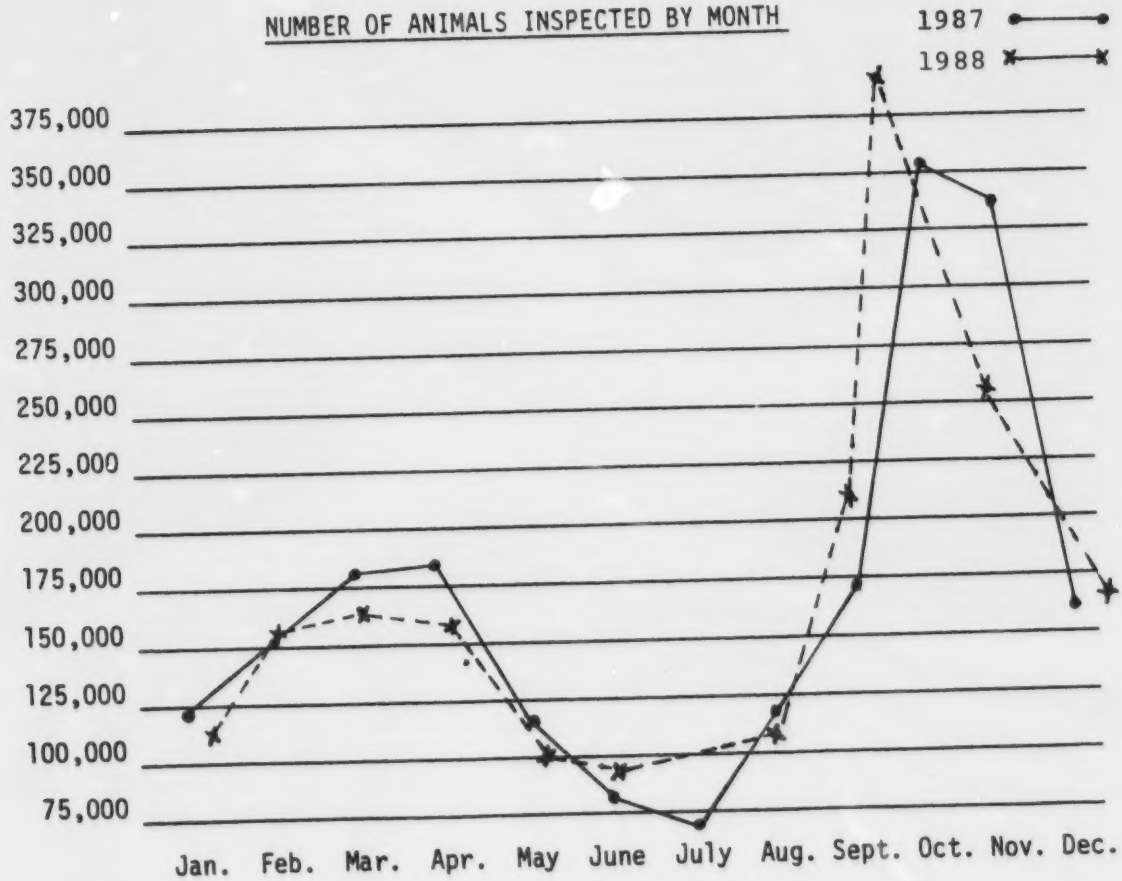


1984 - 1988

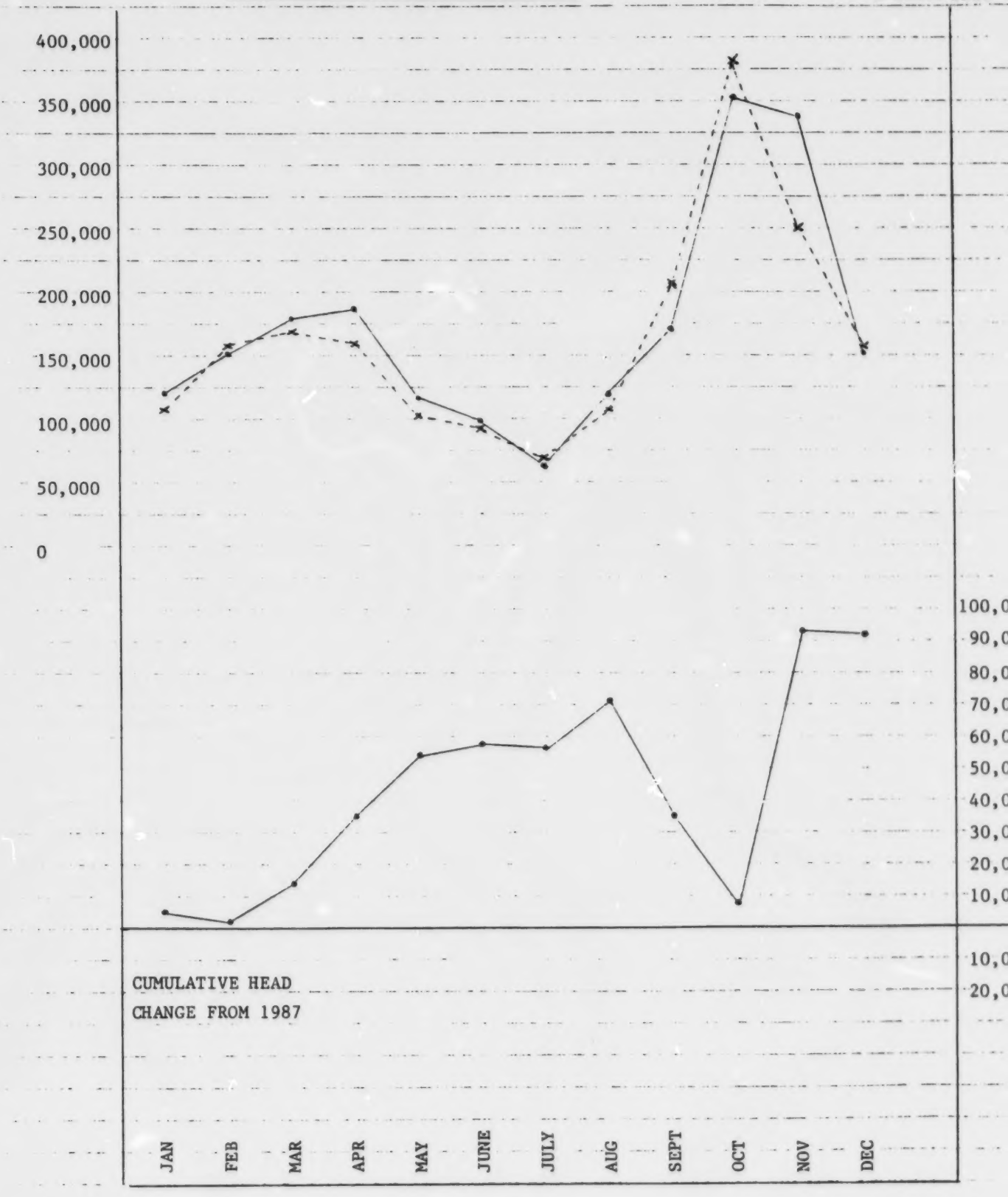
TOTAL NUMBER OF LIVESTOCK INSPECTED AT AUCTION MARKETS



NUMBER OF ANIMALS INSPECTED BY MONTH



LIVESTOCK INSPECTION AT
PUBLIC LIVESTOCK MARKETS, ALBERTA



CATTLE

Reasons for Rejection/Slaughter

	1984		1985		1986		1987		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Abscess	107	1.7	106	1.8	77	1.4	107	1.7	108	1.9
Arthritis	126	2.0	119	2.0	89	1.7	131	2.1	202	3.6
Bloat	37	.6	38	.6	27	.5	42	.7	30	.5
Cancer Eye	1569	24.9	1371	23.1	1452	27.1	1491	23.4	1356	24.2
Cardiac	33	.5	28	.5	38	.7	51	.8	72	1.3
Central Nervous Disorders	15	.2	12	.2	26	.4	23	.3	20	.4
Distress	155	2.4	208	3.5	168	3.1	191	3.0	132	2.4
Enteritis	194	3.1	231	3.9	231	4.3	328	5.1	296	5.3
Febrile	549	8.7	52	.9	---	-.-	-.-	-.-	---	-.-
Footrot	65	1.0	194	3.3	74	1.3	70	1.1	84	1.5
Hardware	9	.1	3	.1	3	.1	12	.2	15	.3
Lame	602	9.5	634	10.7	690	13.0	682	10.7	576	10.3
Lice	30	.5	8	.1	---	-.-	-.-	-.-	---	-.-
Lumpjaw	584	9.2	491	8.3	416	7.9	421	6.6	411	7.3
Mastitis	147	2.3	166	2.8	189	3.5	185	2.9	132	2.4
Navel Infection	160	2.5	161	2.7	137	2.6	107	1.7	173	3.1
Physical Abnormalities	46	.7	42	.7	20	.4	29	.4	84	1.5
Pinkeye/Eyes	429	6.8	505	8.5	270	5.0	350	5.5	439	7.8
Pneumonia	752	11.9	1008	16.9	811	15.1	1544	24.2	880	15.7
Ringworm	182	2.9	119	2.0	158	3.0	78	1.2	47	.8
Under Age	47	.7	37	.6	20		53	.8	29	.5
Urogenital	228	3.6	202	3.4	239	4.5	224	3.5	305	5.5
Warts	0	.0	0	.0	---	-.-	-.-	-.-	---	-.-
Other Diseases	267	4.2	203	3.4	209	4.0	259	4.1	206	3.7
TOTALS	6333	100.0	5938	100.0	5344	100.0	6378	100.0	5597	100.0

* Beginning in 1986, "febrile" cases have been combined with "pneumonia".

HORSES

Reasons for Rejection/Slaughter

	1984		1985		1986		1987		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Influenza	2	3.5	9	16.3	2	6.3	4	2.8	12	11.3
Lame	13	22.8	10	18.2	6	18.7	10	7.1	23	21.7
Pneumonia	16	28.1	4	7.3	-	-.-	5	3.5	1	1.0
Strangles	10	17.5	--	-.-	4	12.5	90	63.4	5	4.7
Other Diseases	16	28.1	32	58.2	20	62.5	33	23.2	65	61.3
TOTALS	57	100.0	55	100.0	32	100.0	142	100.0	106	100.0

GOATS

Reasons for Rejection/Slaughter

	1984		1985		1986		1987		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lymphadenitis	6	23.1	5	12.2	3	5.8	9	41.0	3	21.4
Mastitis	7	26.9	11	26.8	5	9.6	8	36.4	1	7.1
Pinkeye	--	-.-	1	2.4	-	-.-	-.-	-.-	4	28.6
Pneumonia	2	7.7	1	2.4	3	5.8	2	9.1	2	14.3
Skin Disease	--	-.-	3	7.4	-	-.-	-.-	-.-	--	-.-
Other Diseases	11	42.3	20	48.8	41	78.8	3	13.6	4	28.6
TOTALS	26	100.0	41	100.0	52	100.0	22	100.0	14	100.0

SHEEP

Reasons for Rejection/Slaughter

	1984		1985		1986		1987		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Abscess	1	.1	1	.2	4	1.0	4	.6	2	.3
Arthritis	2	.2	---	-.-	1	.2	-.-	-.-	---	-.-
Brucella Ovis	11	1.4	---	-.-	---	-.-	-.-	-.-	---	-.-
Distress	2	.2	1	.2	49	12.5	8	1.1	5	.9
Footrot	680	86.5	494	85.9	210	53.6	644	92.4	494	88.4
Lame	28	3.6	---	-.-	24	6.1	2	.3	23	4.1
Mastitis	5	.6	9	1.5	2	.5	17	2.4	5	.9
ORF	29	3.7	---	-.-	---	-.-	-.-	-.-	---	-.-
Pneumonia	15	2.0	13	2.3	66	16.9	7	1.0	6	1.1
Other Diseases	13	1.7	57	9.9	36	9.2	15	2.2	24	4.3
TOTALS	786	100.0	575	100.0	392	100.0	697	100.0	559	100.0

SWINE

Reasons for Rejection/Slaughter

	1984		1985		1986		1987		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Arthritis	447	5.7	264	5.8	190	6.8	215	6.1	249	5.5
Central Nervous Disorders	11	.1	---	-.-	4	.1	4	.1	7	.2
Dermatitis	67	.9	2	.1	1	-.-	-.-	-.-	5	.1
Distress	420	5.3	189	4.2	83	3.0	108	3.1	60	1.3
Enteritis	206	2.6	34	.8	40	1.4	76	2.1	64	1.4
Lame	89	1.1	49	1.1	26	.9	155	4.4	100	2.2
Mange	1839	23.2	1118	24.7	629	22.6	674	19.1	1275	28.2
Parasitism	23	.3	---	-.-	18	.6	-.-	-.-	-.-	-.-
Physical Abnormalities	31	.4	111	2.5	74	2.7	122	3.5	68	1.5
Pneumonia	356	4.5	92	2.0	28	1.0	16	.5	36	.8
Rhinitis	2016	25.4	1265	28.0	620	22.3	629	17.9	708	15.7
Underweight	2157	27.2	1202	26.6	1015	36.4	1278	36.3	1774	39.2
Other Diseases	258	3.3	193	4.2	60	2.2	243	6.9	178	3.9
TOTALS	7920	100.0	4519	100.0	2788	100.0	3520	100.0	4524	100.0

REFERENCE LABORATORIES BRANCH

The Reference Laboratories' principal responsibility was to provide technical laboratory services and expertise in microbiology, histology and toxicology. The laboratory, located in the O.S. Longman Building, Edmonton, provided laboratory services for veterinary pathologists working in the diagnostic pathology laboratories, other Animal Health Division veterinarians functioning as field investigators, epidemiologists and herd health specialists and private veterinary practitioners. It also acted as a central reference laboratory to the other regional provincial laboratories by providing sophisticated expertise such as viral isolation, special microbiology, chemical analysis and electron microscopy.

The Branch objectives were: to deliver a regional and a province-wide diagnostic laboratory support service; to provide laboratory support services necessary for monitoring important animal diseases in livestock populations; to provide consultation in specialized areas; and to conduct or participate in applied research projects. The laboratory provided appropriate technical workshops as part of a continuing education to the various Division scientists and veterinarians and veterinary practitioners. It also provided a federally accredited fish health laboratory service.

The Reference Laboratories Branch was divided into four sections. These are:

VIROLOGY-SEROLOGY SECTION:

This section provides diagnostic services to veterinarians, pathologists and producers. Their primary function is to conduct serology and to detect viruses and Chlamydia in animal and poultry submissions. The laboratory initiates and participates in co-operative projects and disease investigations with other disciplines. The laboratory regularly performs quality control on methodology and submits samples to other recognized laboratories for comparative testing.

Services Available:

The following services are available:

- isolation of major viruses on primary cell cultures and embryonated chicken eggs.
- immunofluorescence.
- enzyme-linked immunosorbent assays (ELISA).
- serum neutralization for the detection of antibodies.
- hemagglutination inhibition.
- indirect immunofluorescence.

New Findings and Interesting Cases:

Bovine Viral Diarrhea Virus

In 1988, an increase of fetal submissions was experienced. Bovine viral diarrhea virus (BVDV) was detected in numerous cases by immunofluorescence and/or virus isolation. BVD virus isolation was successful and dependent upon the increased number of blind passages as

well as a selective application of immunofluorescence to detect this agent in tissues and cultures. The significance of BVD virus detection has not been established but will be studied next year.

Potomac Horse Fever

There was suggestive evidence of Potomac Horse Fever (PHF) in an enzootic area in Alberta. Serological surveys on this isolated area demonstrated the presence of high titres to Ehrlichia risticci implicating it as a causative agent of the syndrome.

Aleutian Disease

An Aleutian Disease survey was conducted on a limited scale and serology detected one reactor out of 376 serums tested.

Equine Arteritis Virus

This virus was first isolated in Canada in our laboratory in 1987. The demand for Equine Arteritis Virus (EAV) diagnosis was much less in 1988 than in 1987. No new isolations of this agent was made. Numerous serum analyses were performed, however, and the results indicated that EAV is still present and may be responsible for some reproductive failures.

Sendai Virus

Pigs may be infected with this virus and develop pneumonia. We have isolated Sendai Virus from the lung tissue of mice that died from pneumonia. This is the first time this agent was recovered in this laboratory.

Pacheco Disease

A herpesvirus that causes disease of parrots was isolated from a psittacine bird submission. The isolation of this agent is not difficult yet its incidence in this laboratory is fairly rare.

Porcine Influenza

It is believed that the pandemic of 1918-19 in man was caused by a virus related to swine influenza. We have isolated a swine influenza virus for the first time in this laboratory from two diagnostic submissions from pigs. The identification of the agents was done by immunofluorescence and electron microscopy. The FA conjugate was obtained from Ames, Iowa.

PROJECTS:

Virus Tracking Project

The Virology-Serology Section undertook a virus tracking project. Forty-eight young calves in a well controlled environment at the University Farm at Kinsella, Alberta were serially bled and some of the serum samples tested for antibodies against Infectious Respiratory Bronchitis (IBR), Bovine Viral Diarrhea Virus (BVDV), Parainfluenza (PI_3) and Bovine Respiratory Synctial Virus (BRSV). It is hoped that serologic monitoring combined with other observations on management and environmental factors will allow us to arrive at valuable conclusions affecting health management.

A similar project involving a larger group of animals is in progress. In

this case, the animals were vaccinated and the virus monitoring will take into account the effect of vaccination on the spread of viruses. Both projects will continue in 1989.

Serology in the Swine Herd Health Program

Based on the initial success with the use of ELISA kits supplied by Veterinary Infectious Disease Organization (VIDO), serologic monitoring of high health category swine herds was continued on an experimental basis. These results became erratic and interlaboratory quality control was initiated. It was determined that further testing may be required to determine the reliability of serologic diagnosis.

Eight-hundred swine serum samples were tested by serum neutralization for the presence of antibodies to transmissible gastroenteritis. All serums tested were negative.

"Snicking"

The laboratory was involved in investigating the effectiveness of vaccination in chickens. It was suspected chickens were showing signs of "snicking". It was suspected that vaccination might trigger these symptoms. The investigation failed to reveal any correlation between vaccination and the presence or absence of "snicking."

Elk Blood Processing

Elk to be imported into Alberta were required to be free from genetic

impurities of red deer. The Virology-Serology Section continued to provide assistance to the Department of Fish and Wildlife in the parentage testing of elk. This included the processing and shipping of 1,180 elk bloods to New Zealand for genetic analysis.

BVD and Reproduction

A study on the role of BVD virus in reproduction was initiated. Investigation includes virus isolation, immunofluoresence and serology. Collection and processing of specimens will be continue into 1989.

PROTOCOL IMPROVEMENT

Improving the quality of virology specimens has been done by trying to minimize the chance of autolysis in tissues which are submitted by providing freezer packs for the collection tray in the post mortem room and by freezing specimens at -80 degress Centigrade immediately upon receipt when they cannot be processed. Chlamydia detection has been improved by preserving the viability of the organism after collection. Our laboratory produced a new transport medium for this purpose.

Significant changes were implemented in virus isolation protocol. Homogenized tissues are centrifuged at a lower speed. MEM is used instead of PBS for suspending homogenized tissues. Infected cell cultures Homogenized tissues are centrifuged at a lower speed. MEM is used are trypsinized between passages rather than frozen and thawed. Three to four passages are carried out instead of two. More cell lines are used for virus isolation. Immunofluorescence testing is more

rigorously controlled.

DATA PROCESSING

A large volume of data is generated in the laboratory. It has become evident that correlation studies may be done using this data and other data readily accessible in a record keeping system. In order to facilitate such studies, a complex spreadsheet has been created using Lotus 1-2-3 to store information on diagnostic submissions.

QUALITY CONTROL

Specimens were exchanged with the following laboratories: Palliser Laboratories, Lethbridge; Western College of Veterinary Medicine and Veterinary Infectious Disease Organization, Saskatoon; VSB, Guelph; the veterinary laboratory in Winnipeg and the University of Montreal in St. Hyacinthe. The analyses of results indicate that our results correlated well with those of others, especially in the field of BVD and IBR serology and virus detected.

BACTERIOLOGY SECTION:

Introduction

The Bacteriology Section provides both aerobic and anaerobic bacterial cultures and *Mycoplasma* culture methodology and identification for the purpose of identifying etiologic agents which cause disease. It receives submissions principally from the Pathology Branch and pathologists doing post mortems as well as practitioners in the field. The bacteriology laboratory processed 15,528 specimens during 1988, which was a decrease of 7 per cent from the previous year. Dr. Matt Schoonderwoerd became head of the section.

The following information are major activities and findings from the laboratory:

Mastitis

Four-thousand three-hundred and fifty-four milk samples from 557 submissions were cultured, which was an increase of 14 per cent from the previous year. *Staphylococcus aureus* is the number one contagious pathogen identified from mastitic milks. *Streptococcus agalactiae* was a distant second representing 8 per cent. Environmental pathogens accounted for 32 per cent.

An epidemic of mastitis caused by *Norcardia* species was identified in Alberta on 27 farms and across Canada.

Routine antibiotic susceptibility testing for Staphylcococus aureus was discontinued mainly because there was not much difference in susceptibility patterns over the past three years. In addition, clinical response to treatment is often disappointing.

One of the great events was the incorporation of somatic cell counting for 1,750 milk samples submitted for culture. A somatic cell count (SCC) gives an objective count and identifies the presence of mastitis. The SCC provided an additional valid test which assisted greatly in the interpretation of culture results.

Enterotoxigenic Escherichia coli (ETEC)

Fifty-two per cent of porcine intestinal specimens were positive for K88 ETEC. The method used for identification is seroagglutination from a blood agar plate. Thirty-two per cent of bovine intestinal specimens were positive for K99 F41-ETEC. The method used was the IFAT procedure on direct intestinal smear. This methodology was an improvement over using the anti-F41 prepared in rabbits, which was not as specific. This year was the first time we identified 987P-ETEC from one- to four-day-old scouring piglets. We prepared a live E. coli milk vaccine for the pregnant sows for one particular veterinary practitioner.

Verotoxigenic Escherichia coli (VTEC)

VTEC 05, 026, and 0111 were identified from several cases of dysentery in two- to six-week-old dairy calves and in one beef herd. All three

serogroups of VTEC have the potential of causing hemorrhagic colitis in man as well as infecting animals.

Salmonella species

Salmonella typhimurium is the most common isolate from cattle. This organism was isolated on 22 cattle premises of which 9 were calf rearing facilities.

Phagetyping of all Salmonella typhimurium isolates revealed that PT104 circulates through Alberta auction marts and is directly derived from British Columbia. Salmonella enteritidis was a major concern in the U.K. and the U.S.A. In Alberta, two broiler operations, one cow and two zoo animals experienced infection with this organism.

Salmonella dublin was identified in calves on four new premises this year. Two were calf rearing facilities, one was a dairy which purchased some calves, and one was a dairy which purchased American cattle two to three years ago.

Poultry Health Program

Specimens submitted under PHP are mainly for Salmonella detection. Specimens consisted of litter, nests and feeds, cloacal swabs, chick pads and fluff samples. Submissions represented 21 per cent of our specimen load. Salmonella spp. were isolated from 71 specimens derived from 42 cases. In 1987, there were 167 isolates from 54 cases. The most common

isolate was Salmonella hadar.

Mycoplasma/Ureaplasma

Specimens increased markedly from 223 to 525. From 49 porcine lung specimens, 18 specimens were positive for Mycoplasma hyorhinis and one was positive for Mycoplasma hyopneumoniae by culture. Mycoplasma spp. and Ureaplasma diversum were often present in the same specimens from bovine vulva, vagina, semen, preputial wash. M. bovis was identified from bovine lung and synovia in two cases. M. gallinarium was isolated from exotic birds and from a case of conjunctivitis and air saculitis in newly hatched exotic birds.

Leptospira Exam

The IFAT procedure was routinely used for identifying Leptospira using a separate conjugate for L. hardjo/bovis and L. pomona. Only fetal kidneys which showed histologic evidence of inflammation were examined. Leptospirosis testing had to be qualified because of the very low detection rate, subjectivity of IFAT/FAT, and difficulty relating results to the presence of lesions and the time for FAT procedures of 60 minutes per examination.

Routine Leptospira checking of urinary sediment and seminal fluid smears from boars of the A.I. Unit was terminated.

Campylobacter Exam

Campylobacter coli and C. hyointestinalis were routinely identified from pigs suffering from intestinal adenomastosis syndrome. A project was conducted to see which type of media is best suited for the primary culture of Campylobacter spp. of veterinary interest. It was concluded that Brucella agar selective medium with blood and supplement was best along with a second selective media known as Campylobacter free selective medium with blood and Preston supplement added.

Actinobacillus suis/equuli

These two organisms are very similar. Actinobacillus equuli has been reported as a commensal in the tissues of a horse. We have identified this organism in horses and pigs as pathogens. Actinobacillus suis is reported to be mainly pathogenic in pigs of all ages characterized by septicemia, pneumonia and arthritis. We identified this organism six times in pigs. We also identified a A. suis in equine cases from fetal stomach content, joint fluid, heart, gutteral pouch and spleen.

Actinobacillus pleuropneumoniae

Twenty-seven isolates of A. pleuropneumoniae from affected porcine lungs were serotyped by IFAT procedures. Results:

Serotype 1	2 isolates	7%
Serotype 3	3 isolates	11%
Serotype 5	17 isolates	63%
Serotype 7	5 isolates	19%

Media

The production of media continues to play an important role in the Bacteriology Section. Seventy-six varieties of media were made during the year; 35 varieties are made on a regular basis accounting for 1,360 litres.

Shipping

Shipping for the veterinary laboratory in Edmonton has evolved into a responsibility for the Bacteriology Section since the majority of shipments originate there. This problem reaches astronomical proportions of complexity as 67 shipments were made under the new Dangerous Goods Act. Fourteen shipments on dry ice were made to New Zealand which necessitated dangerous goods documentation. Personnel have attended seminars dealing with the federal regulations regarding the shipping of infectious substances, dry ice and formalin.

Projects

The following projects have been carried out by the Section:

1. Somatic cell counts of mastitic milks.
2. Evaluation of Brucella agar and Campylobacter blood free selective agar with the addition of five selective supplements for the isolation of Campylobacter spp. of veterinary interest.
3. Semi-automated enumeration of bacteria in hatchery fluff.
4. Enumeration of hatchery fluff comparison of the Vitek with the standard plate count.

The following are projects carried out in support of other projects:

1. The role of questioning Clostridium perfringens or its toxin in the pathogenesis of hepatosis/hepatitis syndrome in broilers.
2. Isolation of Pasteurella aeruginosa from mice which received immunosuppressive proteins.

TOXICOLOGY SECTION:

Introduction

The veterinary toxicology laboratory provide services of analytic chemistry to diagnose disease in animals caused by poisons and chemical substances. It also analyzes body tissues from minerals and vitamins, performs clinical chemistry for enzymes and metabolites, conducts tests for environmental toxicology relating to farm animals and conducts chemical analyis on farm water supply. It conducts and participates in projects and investigational research initiated within the laboratory the Animal Health Division, other government departments, universities, or by veterinarians, farmers or farm organizations. The purpose of the laboratory is to provide analytic chemistry to diagnosing animal disease and assist in food animal production.

Summary of Services

Apart from consultation and field investigation, the following analytic capabilities and instrumentation are available:

- atomic absorption spectrophotometry
- graphite furnace AA analysis
- gas chromatography
- liquid chromatography - high pressure and thin layer
- mass spectroscopy combined with GC and purge-trap instrumentation
- ion chromatography
- visible absorption spectrophotometry
- clinical chemistry analyzing

- mercury vapor detector
- gamma counter - for radioimmunoassays
- wide range of ancillary laboratory equipment permitting organic solvent extractions and processing of specimens for a wide spectrum of demands.

QUALITY CONTROL

CAPS - this is a quality control program operated across North America by the College of American Pathologists.

Selenium Interlaboratory Check Sample Program

This is carried out by shared sample analysis between five laboratories organized from Ames, Iowa.

Blood Cholinesterase

This procedure was re-established and results verified between ourselves and the toxicology laboratory at Western College of Veterinary Medicine.

Alberta Water Analysis Committee (AWAC)

An organization with 22 laboratory participating conducting round robin sample analysis on water.

METHODS DEVELOPMENT

Headspace Analyzer for the Mass Spectrometer

A Tekmar 4000 dynamic headspace concentrator was attached to the GC/MS

instrument. This apparatus allows analysis of volatile materials, such as gases and solvents by the GS/MS.

Vitamin A and E Analysis

In 1987, a method was developed to analyze vitamin A and E simultaneously by HPLC on an automated system. The technique has been sufficiently successful that the Association of Official Analytic Chemists wish to establish the method as an official test.

Feed Additives

Feed additive methods development is a continuing commitment in order to provide the broadest range of analyses possible for all feed additives. Added to our list of available analyses this year are roxarsone, amprolium, ivermectin and sulfamethazine.

S-Methylcysteine Sulfoxide in Kale

This chemical is present in kale and is though responsible for causing anemia in cattle. The method was developed to support concerns of the Soils and Animal Nutrition Laboratory as kale may be developed as an alternate forage to increase cattle productivity.

6-Methoxybenzoxolinone (6-MBOA)

Techniques were developed on the GC/MS to identify this novel plant metabolite. It enhances follicle stimulating hormone and increases ovulation.

Blister Beetle Cantharadin

These are insects found in alfalfa hay and grain which contain a chemical substance called cantharadin that produce intense irritation and inflammation.

Iodine in Serum

Iodine excess from feed additive organic iodine is a public health concern and a technique was used to identify excess iodine in the dietary intake using a specific ion electrode instrument.

Cholinesterase in Brain Tissue

This test was developed as one of the more reliable indicators of post mortem diagnosis of organophosphate poisoning.

FIELD INVESTIGATIONS

Thyroid Dysplasia in Newborn Foals

A complex of congenital abnormalities has occurred in a Standardbred Breeding Farm. The abnormalities consist of hypothyroidism and thyroid hypoplasia, mandibular prognathism and severely contracted tendons in the front legs. No satisfactory or singular cause has been identified as responsible but an autosomal recessive gene is suspect.

Photosensitivity in Horses

Photosensitization, icterus and liver disease occurred in horses on two different premises in geographically associated locations. The cause of

the photosensitization was not proven, but it is suspect that Amaranthus spp. (red rooted pigweed) is the most likely cause. Consumption of this plant was probably occasioned by a severe drought during the early summer. In the course of the investigation, serology was performed for Potomac Horse Fever and one farm was strongly positive.

Sour Gas Emergency Response

A training exercise was organized and delivered by Alberta Public Safety Services in co-operation with Energy Resources Conservation Board and other government agencies. A blowout in an agricultural area did occur in the summer and Alberta Agriculture's response was praised by the news media in that we were able to assist producers to cope with the problem.

PROJECTS

Pesticides in Water

The laboratory participated in an international quality assurance program for the analysis of pesticides in water. This was an exercise for our laboratory in developing techniques in looking for small quantities of pesticides.

Selenium - Vitamine E in Feedlot Cattle

A co-operative project with Gary Matheson with the University of Alberta and Dale Engstrom of the Soil and Nutrition Laboratory and the Immunology Department of WCVM was designed to evaluate the influence of selenium and vitamin E on the disease resistance and immunity in feedlot cattle. Our

laboratory did the analysis on samples for selenium and vitamin E. The project has not yet been completed.

Monensin in Lactating Sows

Contamination of feed for lactating sows occurred in a feed mill which had processed a batch of feed for chickens containing "Coban" prior to making the sow feed. Monensin was preset at 3 ppm. A syndrome occurred in the sows, which was very suggestive of monensin toxicosis. The enigma is that pigs have been shown to tolerate much higher levels of monensin than were present in this feed.

Kochia

Kochia has previously been classified as a weed, but recently has been utilized as a forage for maintaining beef cattle over the winter, particularly in the drought stricken Prairie provinces. The problem of using it as a forage is that several toxicities are associated with the plant. These toxicities are loss of weight, hepatogenous icterus and nephrosis. Present efforts have disclosed unusually high levels of a nitrogenous substance that may have some bearing upon amino acid or protein metabolism. A research grant has been allocated for this study from Canada Alberta Research Technology Transfer (CARTT).

Tansy Vulgare

Interest in this plant arose because it is a weed occurring more commonly in the past few years along roadside ditches and invading hay fields. It

is a close relative of tansy ragwort, a known hepatoxic plant. A small project was undertaken to determine if Tansy vulgare is capable of producing liver disease. The results indicated that it was not a significant toxic concern to livestock.

Mycotoxin Project

This was a joint project with the Alberta Environmental Centre. We performed the analysis for mycotoxins and have completed our role in the project. The purpose was to determine if mycotoxins occurred in overwintered grain and if we had toxin-producing species of fungi in Alberta. No mycotoxins were found in Alberta grain. The toxin-producing species were present. Continuing diagnostic casework has disclosed the occasional presence of Trichothecene mycotoxins but the usual conditions of temperature and humidity are not favorable for mycotoxin production in Alberta.

NEW FINDINGS, CONCLUSIONS AND TRENDS

Vitamin E and Selenium

Results of analyses performed in the laboratory would indicate a major deficit in animal husbandry caused by inadequate nutrition for vitamin E and selenium. Over the years selenium has been known to be deficient in Alberta and consistent efforts are made to supplement this trace element. However, serum testing of numerous cattle specimens have indicated that vitamin E is an equally deficient product and the pattern of analysis would suggest that it is destroyed on storage and animals show up with a

deficiency at the end of the winter. Vitamin E deficiency is often unpredictable but it appears the deficiency is more commonly associated with silage feeding suggesting that the ensilage of feed destroys vitamin E or it increases the oxidant load on the animal. Vitamin E occurs independent of vitamin A but when both levels are deficient it usually indicates gross nutritional mismanagement.

Lead Poisoning

Lead continues to be the most common cause of poisoning in cattle. However, in 1988 the incidence nearly tripled. One case involved a herd in which 31 animals showed toxic elevations of lead in the blood. This required a large quantity of antidote but unfortunately the cost of the antidote has escalated because only one pharmaceutical company supplies calcium versonate. The laboratory has now stocked 1 kilogram of calcium versonate, which can be available for emergencies involving large numbers of lead poisonings, for a very reasonable cost.

The epidemiology of lead poisoning is interesting. The dramatic rise in cases was coincidental with a record breaking drought - possibly animals were on pasture longer and were searching for more unusual things to eat. The 31-animal outbreak occurred from an oil company lubricant which was left as a source of the poison.

Treated Seed - Insecticide

Terbufos was identified as a cause of cattle death resulting from

consumption of discarded seed cleaned out of a seed drill. This is the second most common cause of poisoning in cattle in our experience.

Algae Poisoning

Considerable attention was focused on algae poisoning of livestock and its public health significance. Only one major outbreak of algae poisoning occurred which was located in British Columbia. Forty-one cattle died and it was interesting to note the toxin remained in the water of the affected lake for many weeks following the initial onset of poisoning.

Monensin

A year ago we developed a convenient analytic procedure for monensin in our laboratory as part of our commitment to developing a wide spectrum of feed additive analyses. Of the 26 different feed additives that we may detect, monensin has proven to be the most significant contaminant and toxicant. All manner of feeds have been shown to contain monensin when it should not be present. The feed has been used for horses, dog food, pig food and lambs.

INTERESTING CASES

Petroleum Poisoning

Hydrocarbon poisoning occurred when cattle were exposed to hydrocarbon products resulting from an overflow of holding tanks on an oil well lease site. Losses were identified as pneumonias, kidney failure, death of

younger calves and one old cow and foot problems from the potent solvent actions of the hydrocarbon.

Lead Poisoning

Lead poisoning occurred on an oil lease site.

Ivermectin

Subsequent to developing a test to detect ivermectin in order to determine if imported elk were treated for meningeal worm, we were able to offer assistance to researchers at the Western College of Veterinary Medicine. The question arose, whether an animal with inflammation of the meninges would be subject to poisoning with ivermectin. We examined the cerebral spinal fluid to determine the presence of ivermectin and it was negative suggesting that the drug is safe even in inflammation of the meninges.

Weed Seed Toxicity

The drought has caused the use of screenings from cleaning grain to be used as cattle feed. We have developed several tests to apply as a matter of routine in these cases. The usual toxins found in weed seeds were nitrates, allylisothiocyanates and alkaloids.

Plant Poisonings

The only plant poisons identified in the laboratory this year were water hemlock and lupines. We often find lupine alkaloids in the stomach

contents and it is difficult to assess their significance because many pastures contain lupines but not in toxic quantities.

Urea Poisonings

This occurred in a number of cattle exposed to fertilizer which had been spilled in a yard. Mycotoxins are the only significant identification which has occurred in dog food, high moisture barley and in products imported from warmer climates.

Dicoumarol Poisoning in an Aborted Fetus

Several aborted feti were identified with dicoumarol in their blood.

Iron Poisoning

Iron poisoning occurred in a herd of cattle that were allowed access to a rusting flare stack at an oil lease site.

Formaldehyde Contamination in Feeds

One case of formaldehyde contamination was identified. Suspicion was directed towards transportation in railway cars which are often fumigated with formaldehyde.

Strychnine and Ethylene Glycol Poisoning in Dogs

The added technique of adding ethylene glycol to strychnine baits for malicious poisoning of dogs causes considerable problems in effecting satisfactory treatment.

Nicotine Poisoning

Nicotine poisoning occurred in a dog. The dog was presented to the veterinary clinic with typical signs of strychnine convulsive seizures. The dog was alert and it demonstrated a totally flaccid paralysis of the entire body. The symptoms gradually abated over three to four days.

Toxicologic Containerization

We erroneously identified strychnine in the stomach contents that had been placed in a medicine container that previously contained nux vomica as a stomatic stimulant. Further investigation showed the chemical originated from the bottle and not from the stomach.

Unusual Bladder Stone

An iguana bladder stone was sent for analysis and was found to consist of calcium sulfate, a rare stone for a rare creature.

HISTOLOGY-ELECTRON MICROSCOPY SECTION

The histology laboratory processes formalin fixed tissues into quality microscope glass slides for examination by Animal Health Division pathologists. A large variety of special histochemical and immunohistochemical stains are offered to help detect morphological structures and various infectious organisms. The histology staff also utilize glycolmethacrylate (GMA) techniques and special stains to produce glass slides that yield superior resolution in tissue sections.

Electron microscopy services subject a wide variety of specimens to the high resolving ability of the electron beam. The technique is used to visualize viruses and other organisms is fluids, feces and tissues and to examine diseased tissues at the cellular and subcellular level.

Histology:

The number of cases submitted and slides produced was 4,646 and 17,825 in 1988, down from 5,745 and 19,802 in 1987 which is approximately a 10 per cent reduction. Unit value total for 1988 was 182,714. The distribution of cases over the years is represented in Figure 1 and the total slide production is in Figure 2.

Immunoperoxidase (IP) for bovine respiratory syncytial virus (BRSV) was offered routinely and 39 animal tissues were submitted and 10 were considered positive.

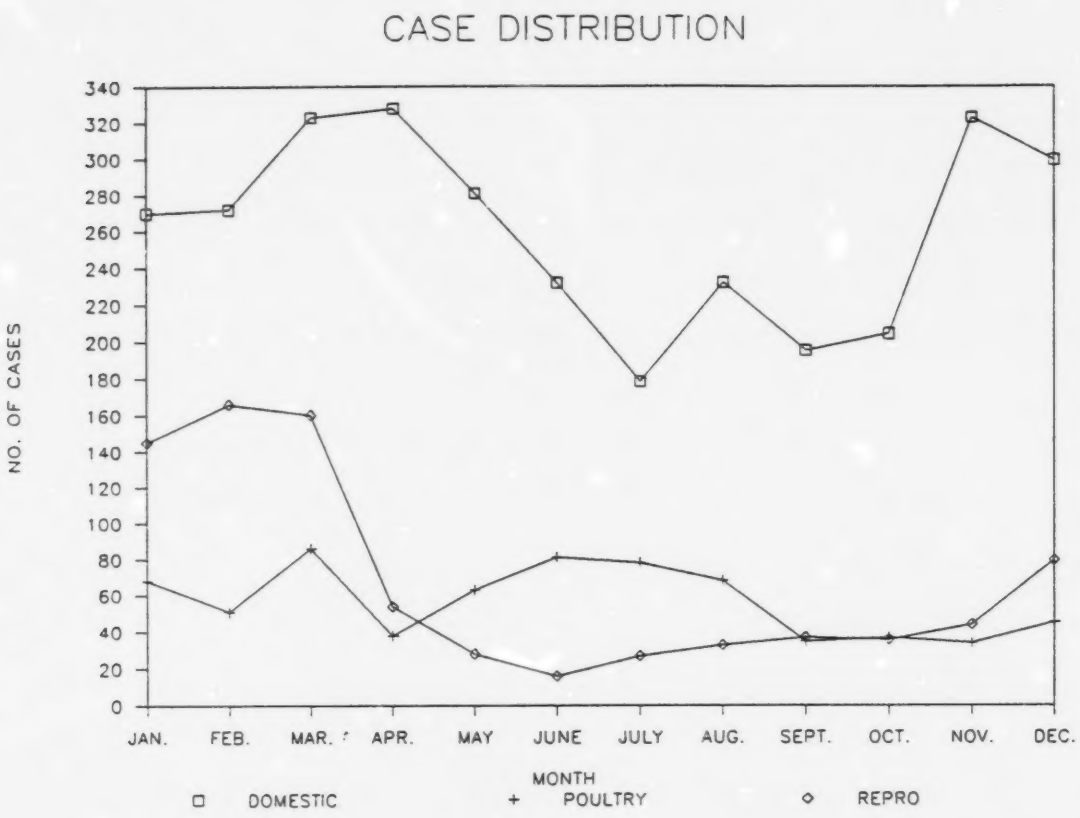

CASE DISTRIBUTION
NO. OF CASES
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
MONTH
DOMESTIC
POULTRY
REPRO

Figure 1

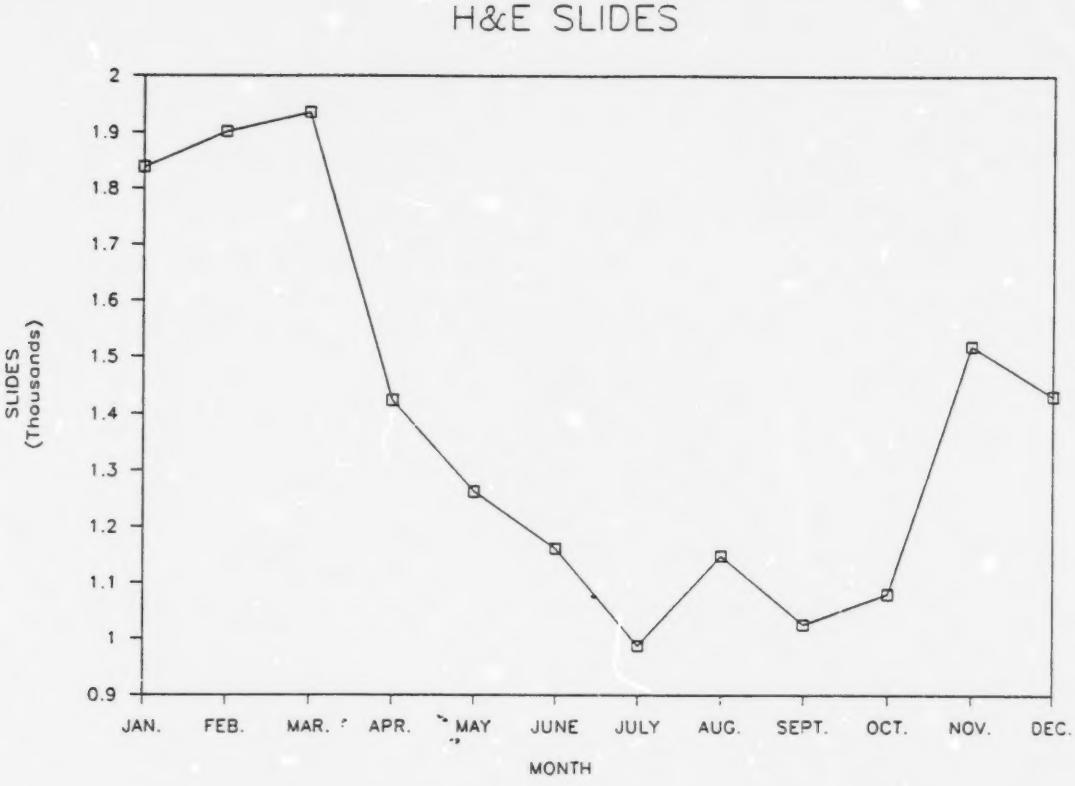

H&E SLIDES
SLIDES (Thousands)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
MONTH

Figure 2

Several projects were conducted as inhouse trials or for pathologists:

1. EM autolysis trial on testing the degree of gut autolysis and method of fixation in relation to post mortem (PM) time was run. This involved 43 blocks and GMA sections. Tying gut and injecting fixative proved to be the best method with barely acceptable resolution at 2 hours postmortem.
2. A trial was conducted to evaluate Mirsky's fixative in comparison to formalin. Sixty-six blocks and slides produced Mirsky's was comparable to formalin up to about 48 hours of fixative time.
3. A perirenal hemorrhage project in turkeys totalled 206 blocks and 216 tissues.

Electron Microscopy:

The total number of specimens submitted to the electron microscopy (EM) lab in 1988 was 381. This was a sizeable decrease from the 583 in 1987 (-34.6 per cent). The reduction was, in large measure, due to this change in submissions protocol which was instituted in late 1987 by the Calf Scours Committee.

The number of unit values which were accumulated in dealing with these specimens was 58,542. The amount of time which was devoted to some other activities such as computer use, image analysis and quality control was also recorded and totalled 38,478 unit minutes.

The distribution of specimens and unit values has been examined in a number of ways.

Figure 1 shows the monthly specimen submission rate. Although the calf scours protocol had changed, the largest number of specimens still arrived in the spring months. Many of these were involved directly or indirectly with the calf scours project. Some of those indirectly involved were part of an autolysis project which was designed to determine limits with respect to fixation methods and allowable time post mortem if ultrastructural detail was to be preserved in intestinal tissue.

In Figure 2, the unit values per month are shown. These include not only the unit values generated from specimens, but also the unit minutes from image analysis, computing, etc. The pattern is very similar to the monthly distribution of specimens, except for a large bump in June. This anomaly was due mainly to a great deal of time spent producing high quality electron micrographs for publication purposes.

The number of specimens from each of the submitting labs was determined and the results are presented in Figure 3. The figures correlate with the size of the lab.

The specimen distribution with respect to specimen type can be seen in Figure 4. The most pertinent observation here is that slightly more that 50 per cent of the specimens were conventional EM. This is much higher than in the past due mainly to the requirement of fixed tissue as part of a calf scours submission.

FIGURE 1

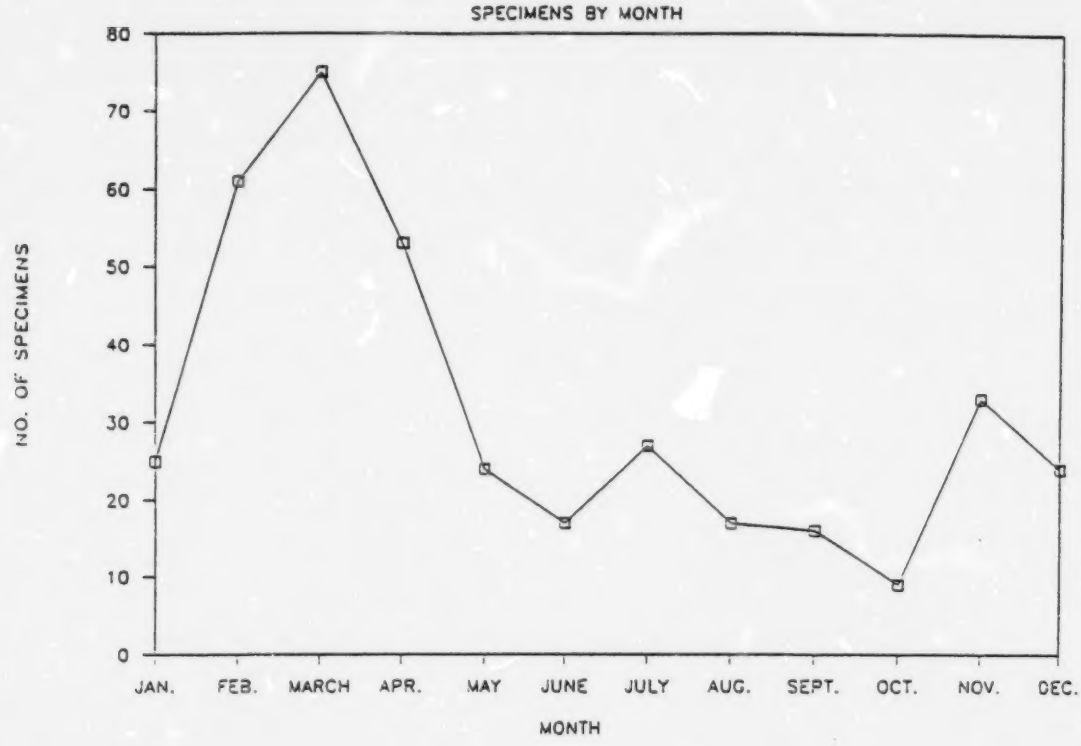


FIGURE 2

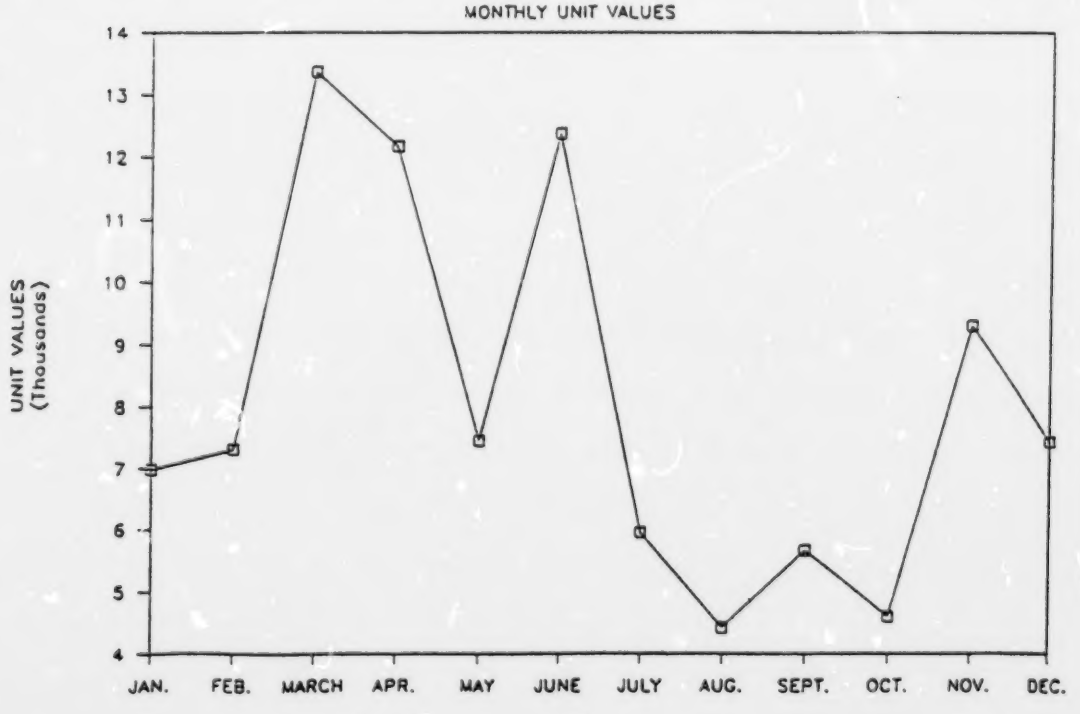
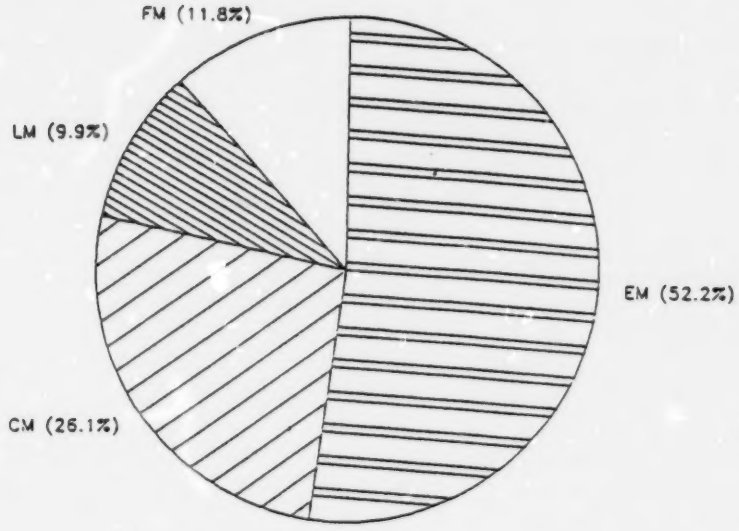


FIGURE 3

SPECIMEN SUBMISSION BY SUBMITTING LAB



FIGURE

SPECIMEN TYPE

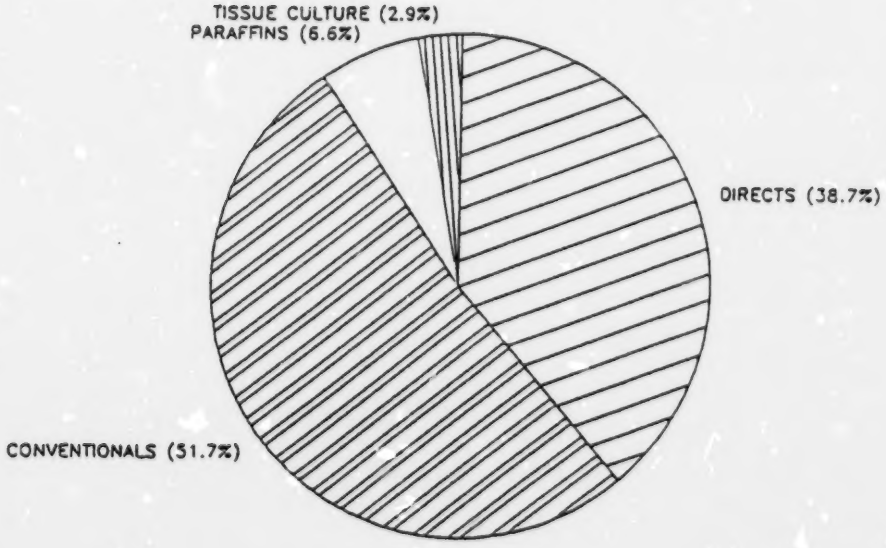


Figure 5 presents the distribution of specimens with respect to species. Exactly 50 per cent (191 of 381) of the specimens submitted were bovine and 62.2 per cent of the unit values devoted to specimens involved bovine specimens. This latter figure can be explained by the large number of unit values required to deal with calf scours conventionals. In 1988, a scours submission included fixed tissues and feces from a fresh dead calf. Thirty-two submissions were received and 20 or 63 per cent were positive for coronavirus. Only 23 of 32 were suitable for ultrastructure and 18 or 78 per cent of them were positive for coronavirus. Of the 23, 11 or 49 per cent were positive for other viruses or bacteria or parasites. Two clinically normal calves were positive for coronavirus.

The second most important species in terms of specimens handled was porcine. Eighty-six specimens were submitted for diagnostic attention and another 16 were used for autolysis study purposes. The total unit values generated by porcine specimens was 10,775. The largest portion of these, by far, was devoted to the search for cornavirus in TGE specimens. The data for transmissible gastroenteritis (TGE) specimens is presented in Table 1, including a breakdown by submitting labs. Specimens from a total of 41 animals were handled and this represents the largest number for any disease, including calf scours. On only six occasions was there a difference between direct EM and FAT results and conventional EM was necessary.

The only other significantly large group of specimens was that from the

FIGURE 5

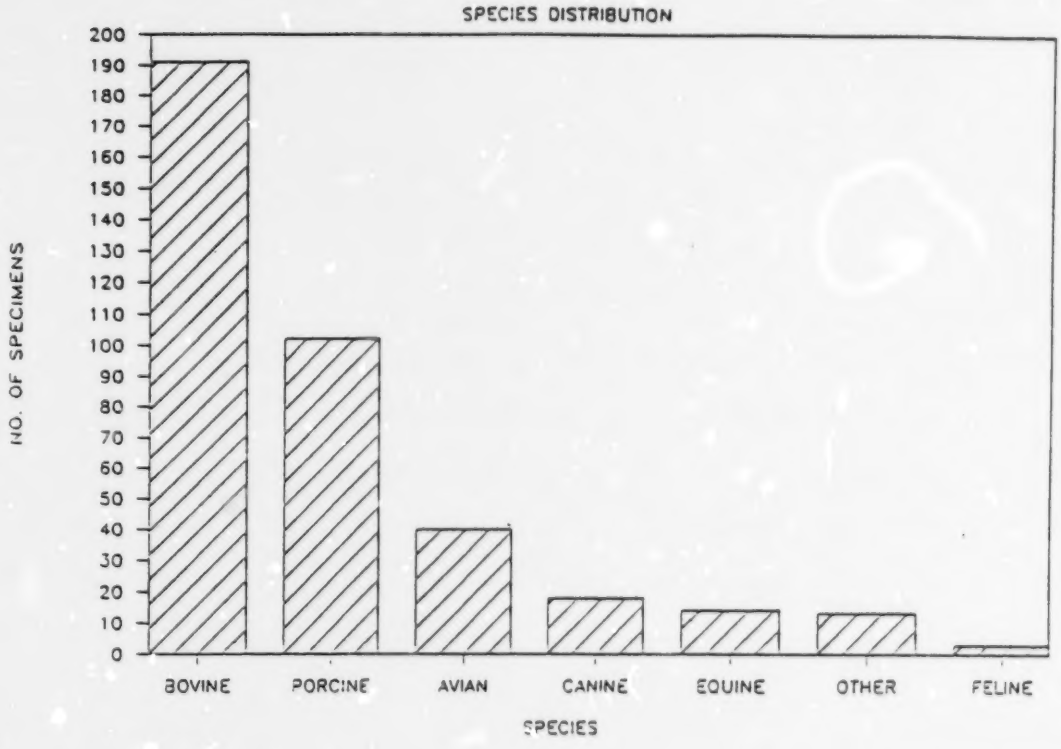

SPECIES DISTRIBUTION
NO. OF SPECIMENS
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
BOVINE
PORCINE
AVIAN
CANINE
EQUINE
OTHER
FELINE
SPECIES

TABLE 1 - TGE SPECIMENS '88

LAB	ANIMALS	DIRECT EM-C+	DIRECT EM-NEG.	CONVENTIONAL EM DONE	CONVENTIONAL EM C+	UNIT VALUES
EM	17	5	12	3	1	3826
CM	10	1	9	0	0	1246
FM	16	4	12	3	2	2260
LM	12	0	12	0	0	1096
TOTAL	41	10	31	6	3	8428

poultry sections. The submitting lab distribution and unit value information can be found in Table 2. No particular disease was prominent among those specimens.

If the conventional calf scours specimens are considered as part of a special project, then it may be said that a large percentage of the resources in EM were devoted to special projects in 1989. Table 3 lists the special projects as well as the numbers of specimens and unit values involved in each of them. The specimen count represents 39.6 per cent of the total specimens and the unit value total is 51.9 per cent of all the unit values assigned to specimen handling duties.

Highlights:

Automated image analysis equipment was selected, purchased and installed. The first application of this new technology was to count bacterial colonies on plates by a completely automatic method. A great deal of effort was also expended in establishing a routine for carrying out the measurements on intestinal villi in electron micrographs which would form the quantitative portion of the calf scours project.

Numerous measurements were carried out on image analysis equipment to compare the population of hemidesmosome junctions in control calf skin versus bovine epidermolysis cases.

In intestine from calf scours cases, a number of causative organisms were

TABLE 2 - AVIAN SPECIMENS '88

LAB	CASES #	SPECIMENS	UNIT VALUES
EM	14	19	2741
CM	9	16	1816
LM	3	5	238
FM	0	0	0
TOTAL	26	40	4795

TABLE 3 - SPECIAL PROJECTS '88

PROJECT	SPECIMENS	UNIT VALUES	
SP1	11	2026	SP1=BOVINE EPIDERMOLYSIS
SP2	41	6058	SP2=AUTOLYSIS STUDY
SP3	4	1227	SP3=SHEEP FOOT ROT
SP4	12	1326	SP4=ATTACHING-EFFACING BACTERIA (MS)
SP5	4	829	SP5=MIRSKY'S VS FORMALIN
CSC	69	16567	CSC=CALF SCOURS CONVENTIONALS
BR	16	2336	BR=BOVINE BREDAVIRUS (SC)
TOTAL	157	30369	

viewed. These included coronavirus, rotavirus, BVD virus, attaching and effacing bacteria and cryptosporidia.

Special Projects

The bovine epidermolysis project centered around a genetically-linked condition involving the skin of selected calves from a farm in southern Alberta. Exceptional fragility in the skin of these animals was traced using electron microscopy to the hemidesomosomal junctions in the lamina propria. This region in the affected animals was examined and compared to the same areas in unaffected controls. The comparison was both qualitative (i.e. descriptive) and quantitative involving the use of image analysis.

The autolysis study was an inhouse project designed to determine the limits with respect to time post mortem and fixative used if acceptable ultrastructural preservation was to be achieved. Sections of intestine were removed from euthanized animals (both porcine and bovine) and fixed at varying intervals post mortem using either universal fixative or neutral-buffered formalin. In addition, the intestine tied off and inflated with universal fixative provided the best results. Tissues must be fixed less than two hours post mortem if the ultrastructure is to be preserved acceptably.

Sheep foot rot was a co-operative project with Sharon Lundberg of the Airdrie lab. She was attempting to grow the Bacteroides nodosus organism

and wanted electron micrographs of the result. One of the specimens was a culture of control gram-positive and gram-negative organisms produced in the Edmonton lab so that a procedure for handling such specimens could be established in the EM lab. Two of Sharon's specimens were in agar and the third was a freeze-dried preparation which was grown up in the Edmonton lab. Contamination of the cultures prevented a successful conclusion to this project.

Dr. Schoonderwoerd's group attempted to infect a number of calves with attaching-effacing bacteria which they had isolated and asked the co-operation of EM so that the results could be viewed ultrastructurally. Unfortunately, the bacteria was not isolated from the artificially-infected animals, so the project was abandoned.

Mirsky's fixative was introduced as a possible alternative to formalin and universal fixative so that specimens could be shipped to EM from outside without having to be packaged as dangerous goods. In a trial comparison of Mirsky's to formalin, the former was found unsuitable for ultrastructural preservation.

The specimens of fixed intestine which were submitted as part of any calf scours case and which were processed by "conventional" means for ultrastructural observation formed a very large part of the workload in EM in 1988.

Bredavirus is a recently isolated virus which resembles coronavirus in appearance and has been shown to cause calf scours. It has not as yet been definitely classified. Cases of calf scours caused by this virus had been diagnosed in Saskatchewan and in the late spring of 1988, Dr. Sue Crowe submitted several specimens of calf feces from animals showing symptoms which could have been caused by bredavirus infection. Bredavirus was not definitely diagnosed in any of the specimens.

Two projects were undertaken in image analysis in 1988. The first of these was a co-operative effort between EM personnel and Bacteriology. It involved the establishment of an automated method for the counting of colonies on bacterial plates. In the second, EM personnel trained a PEP employee and set up a method for measuring areas in structures on histology sections. These measurements were used by Dr. Onderka to add quantitation to a publication he was completing.

TABLE I
IMPORTANT DISEASES OF CATTLE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION VIRAL:					
IBR	5	8	33	2	48
BVD	0	5	16	10	31
OTHER	2	6	25	5	38
UNDETERMINED ETIOLOGY	2	7	25	5	39
BACTERIAL:					
CAMPYLOBACTER	1	2	2	1	6
LISTERIA	0	2	4	0	6
BACILLUS	1	8	7	1	17
OTHER	31	39	157	37	264
UNDETERMINED ETIOLOGY	15	26	135	17	193
NUTRITIONAL	1	0	1	0	2
CONGENITAL DEFECTS	29	41	121	13	204
DYSTOCIA	4	17	53	14	88
INFERTILITY	3	0	21	0	24
RESPIRATORY DISEASE					
BOVINE RESPIRATORY SYNCYTIAL VIRUS	0	4	7	2	13
PARASITIC PNEUMONIA	0	0	0	6	6
PASTEURELLA HEMOLYTICA	86	33	149	45	313
INFECTIOUS BOVINE RHINOTRACHEITIS	75	103	144	24	346
GASTROINTESTINAL DISEASE					
ABOMASAL ULCER	3	11	10	9	33
BLOAT	21	33	34	25	113
BOVINE VIRUS DIARRHEA	3	13	32	17	65
BRAXY	1	0	0	1	2
CAMPYLOBACTERIOSIS	0	0	0	0	0
COCCIDIOSIS	2	7	3	3	15
GASTROENTERIC PARASITISM	0	0	0	0	0
NEONATAL ENTERITIS:					
ENTERIC COLIBACILLOSIS	0	2	23	0	25
VIRAL ENTERITIS	1	1	6	0	8
CRYPTOSPORIDIOSIS	0	1	0	0	1

TABLE I
IMPORTANT DISEASES OF CATTLE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
PARATUBERCULOSIS	4	5	28	1	38
RUMINAL ACIDOSIS	1	4	2	1	8
SALMONELLOSIS:					
S. DUBLIN	0	0	0	0	0
S. TYPHIMURIUM	0	0	3	2	5
NERVOUS DISEASE					
CEREBELLAR HYPOPLASIA	0	0	0	1	1
ITEME	0	0	0	0	0
LISTERIOSIS	0	1	0	1	2
POLIOENCEPHALOMALACIA	5	4	10	1	20
MUSCULOSKELETAL DISEASE					
BLACKLEG	4	9	21	0	34
DOWNER COW SYNDROME	0	0	0	1	1
NUTRITIONAL MYOPATHY	0	15	62	3	80
OTHER					
ACARIASIS	1	0	0	0	1
ACTINOMYCOSIS	0	0	1	0	1
ANAPHYLAXIS	0	0	0	0	0
ANTHRAX	0	0	0	0	0
LEPTOSPIROSIS	0	0	1	0	1
MALIGNANT CATARRHAL FEVER	5	2	8	0	15
MALIGNANT EDEMA	5	2	8	0	15
MASTITIS	72	15	383	16	486
TOXICOSIS:					
LEAD	7	6	7	9	29
PESTICIDES	0	2	0	0	2
OTHER	3	0	0	2	5

TABLE II
IMPORTANT DISEASES OF SHEEP AND GOATS

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION ENZOOTIC	6	3	3	0	12
BACTERIAL:					
BRUCELLA OVIS	0	0	0	0	0
CAMPYLOBACTER	1	0	0	0	1
LISTERIA	0	0	0	0	0
OTHER	2	3	9	4	18
UNDETERMINED	2	3	6	3	14
MYCOTIC	0	0	0	0	0
TOXOPLASMA	1	0	0	0	1
CONGENITAL DEFECTS	6	11	6	3	26
INFERTILITY	0	0	0	0	0
RESPIRATORY DISEASE					
NASAL ADENOMATOSIS	0	0	0	0	0
OVINE PROGRESSIVE PNEUMONIA	0	0	0	8	8
PASTEURELLA PNEUMONIA	12	1	8	17	38
PULMONARY ADENOMATOSIS OF SHEEP	0	0	0	0	0
VERMINOUS PNEUMONIA	0	0	2	0	2
GASTROINTESTINAL DISEASE					
BRAXY	0	1	0	0	1
COCCIDIOSIS	11	1	8	1	21
ENTEROTOXEMIA	1	0	1	1	3
GASTROINTESTINAL PARASITISM	0	0	2	0	2
NEONATAL DIARRHEA	0	1	0	1	2
OSTERTAGIASIS	0	0	0	0	0
PARATUBERCULOSIS	4	2	4	2	12
RUMINAL ACIDOSIS	1	2	3	1	7
SALMONELLOSIS	0	0	0	0	0
NERVOUS DISEASE					
CAPRINE ARTHRITIS AND ENCEPHALITIS	0	0	0	0	0
LISTERIOSIS	1	1	1	4	7
POLIOENCEPHALOMALACIA	6	2	6	4	18

TABLE II
IMPORTANT DISEASES OF SHEEP AND GOATS

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
NUTRITIONAL DISEASE					
COPPER DEFICIENCY	0	0	1	0	1
COPPER TOXICOSIS	2	3	1	0	6
MALNUTRITION	1	2	7	4	14
NUTRITIONAL MYOPATHY	0	1	2	2	5
OTHER					
ACARIASIS	0	0	0	0	0
ANTHRAX	0	0	0	0	0
CASEOUS LYMPHADENITIS	0	2	5	2	9
CONTAGIOUS ECTHYMA	1	1	1	0	3
ECHINOCOCCOSIS	0	1	0	0	1
FOOTROT	0	15	3	2	20
HYPOTHERMIA	2	0	0	0	2
LEPTOSPIROSIS	0	0	0	0	0

TABLE III
IMPORTANT DISEASES OF SWINE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION: VIRAL:					
PARVOVIRUS	0	0	4	0	4
OTHER	0	0	4	0	4
UNDETERMINED ETIOLOGY	0	0	4	0	4
BACTERIAL AND MYCOTIC	4	1	6	8	19
CONGENITAL DEFECTS	0	10	2	0	12
LEPTOSPIROSIS	0	0	0	0	0
MASTITIS METRITIS AGALACTIA SYNDROME	0	0	0	0	0
RESPIRATORY DISEASE					
ATROPHIC RHINITIS	0	10	11	3	24
BACTERIAL PNEUMONIA:					
PASTEURELLA MULTOCIDA	17	13	41	7	78
STREPTOCOCCUS SUIS	5	2	10	7	24
HEMOPHILUS PARASUIS	0	2	4	0	6
ACTINOBACILLUS PLEUROPNEUMO	32	4	19	0	55
MYCOPLASMA	1	0	2	0	3
PLEURITIS	5	7	9	1	22
SWINE INFLUENZA	5	0	0	0	5
GASTROINTESTINAL DISEASE					
COCCIDIOSIS	3	2	2	0	7
EDEMA DISEASE	1	0	1	1	3
GASTRIC DILATATION AND TORSION SYNDROME	7	16	14	0	37
GASTRIC ULCER	7	9	9	0	25
INTESTINAL ADENOMATOSIS SYNDROME	15	12	11	2	40
ENTERIC COLIBACILLOSIS	39	17	79	23	158
NECROTIC ENTERITIS	1	4	5	0	10
PARASITIC ENTERITIS	0	1	1	0	2
SWINE DYSENTRY	12	13	13	0	38
TRANSMISSIBLE GASTROENTERITIS	0	3	1	1	5
OTHER					
ACARIASIS	1	0	0	0	1
DEGENERATIVE ARTHRITIS	0	0	0	0	0
EXUDATIVE EPIDERMITIS	6	10	6	1	23
ERYSIPELAS	0	2	2	9	13
MALIGNANT HYPERTHERMIA	0	0	2	0	2
NUTRITIONAL CARDIOMYOPATHY	0	4	13	3	20

TABLE III
IMPORTANT DISEASES OF SWINE

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
POLYSEROSITIS	1	4	10	0	15
PYELONEPHRITIS AND CYSTITIS	0	2	1	0	3
STREPTOCOCCAL POLYARTHRITIS	0	0	3	0	3
STREPTOCOCCUS SUIS II SEPTICEMIA	1	4	16	4	25

TABLE V
IMPORTANT DISEASES OF HORSES

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
REPRODUCTIVE DISEASE					
ABORTION: VIRAL:					
EVR	0	1	2	0	3
EVA	0	0	0	0	0
OTHER	0	2	6	0	8
UNDETERMINED ETIOLOGY	0	0	0	0	0
MYCOTIC	0	0	2	0	2
BACTERIAL	0	5	13	0	18
TWINNING	0	0	2	0	2
CONGENITAL DEFECTS	0	5	3	0	8
GASTROINTESTINAL DISEASE					
COLITIS	0	4	5	1	10
GASTRIC DILATATION/TORISON/RUPTURE	0	0	1	1	2
PARASITIC GASTROENTERITIS	0	0	0	0	0
OTHER					
ALSIKE CLOVER POISONING	0	0	0	0	0
COMBINED IMMUNODEFICIENCY	0	0	1	0	1
EQUINE INFECTIOUS ANEMIA	0	0	0	0	0
GOITRE	0	1	1	0	2
HYPOTHERMIA	0	0	0	0	0
LEPTOSPIROSIS	0	0	0	0	0
STRANGLES	0	1	3	0	4
WESTERN EQUINE ENCEPHALOMYELITIS	0	0	0	0	0

TABLE IV
IMPORTANT DISEASES OF POULTRY

DISEASE	LETHBRIDGE	AIRDRIE	EDMONTON	FAIRVIEW	TOTALS
RESPIRATORY DISEASE					
AIR SACCULITIS	3	17	26	0	46
BRONCHITIS INFECTIOUS	0	0	1	0	1
CHLAMYDIOSIS	0	0	0	0	0
FOWL CHOLERA	1	1	2	1	5
INFECTIOUS LARYNGOTRACHETIS	2	1	7	0	10
INFLUENZA	0	0	0	0	0
NEWCASTLE DISEASE	0	0	0	0	0
SINUSITIS	0	3	10	0	13
GASTROINTESTINAL DISEASE					
COCCIDIOSIS	1	5	55	6	67
COLIGRANULOMA	1	0	0	1	2
FATTY LIVER SYNDROME	0	1	23	0	24
HISTOMONIASIS	1	1	5	1	8
MALABSORPTION SYNDROME	2	2	8	14	26
NECROTIC ENTERITIS	2	2	24	4	32
TRANSMISSIBLE ENTERITIS	0	0	0	0	0
NERVOUS DISEASE					
ENCEPHALOMALACIA	0	0	1	0	1
AVIAN ENCEPHALOMYELITIS	0	0	1	0	1
MUSCULOSKELETAL DISEASE					
ARTHRITIS: STAPHYLOCOCCUS AUREUS	3	6	46	0	55
RICKETS	4	0	10	3	17
VALGUS LEG DEFORMITY/VARUS LEG DEFORMITY	3	10	116	4	133
OTHER					
ACUTE DEATH SYNDROME/CARDIAC FAILURE	3	28	184	3	218
ANEURYSM	0	1	10	0	11
ASCITES/ROUND HEART DISEASE	11	24	119	10	164
EGG PRODUCTION LOSS	0	0	7	1	8
ERYSIPELAS	0	1	3	0	4
HYPOTHERMIA	0	0	1	1	2
INCLUSION BODY HEPATITIS	2	0	12	1	15
INFECTIOUS BURSAL DISEASE	1	7	26	1	35
MAREK'S DISEASE	2	10	14	4	30
POX AVIAN	0	0	0	0	0
SALMONELLOSIS	0	0	9	7	16
STARVE OUT/DEHYDRATION	5	12	100	3	120

RABIES SUMMARY

1988

SPECIES	LOCATION	NUMBER POSITIVE	DATE CONFIRMED
Skunk	NE26-02-12-W4	1	January 12
Skunk	NE07-01-14-W4	1	January 28
Bovine	NE26-02-14-W4	1	February 8
Skunk	NE11-02-13-W4	1	February 16
Skunk	NW23-02-14-W4	1	February 23
Skunk	NW10-01-12-W4	1	April 8
Skunk	NE05-21-14-W4	1	May 20
Skunk	SW09-01-15-W4	1	May 30
Skunk	NE04-01-14-W4	1	May 30
Skunk	NE04-21-14-W4	1	May 30
Skunk	NE16-01-15-W4	1	June 6
Skunk	SW03-01-15-W4	1	June 7
Bat	NE24-20-14-W4	1	July 13
Bat	Parkland County	1	July 15
Bat	Lamont	1	July 28
Bat	Lethbridge	1	August 2
Skunk	SE18-10-04-W4	1	August 12
Bat	Forty Mile County	1	August 12
Bat	NW08-32-05-W5	1	August 23
Bat	Slave Lake	1	August 26

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Skunk	NE10-12-6-W4	1	September 22
Skunk	SE6-10-4-W4	1	September 22
Skunk	NW14-9-5-W4	1	September 22
Skunk	NW10-12-6-W4	1	October 13
Skunk	17-10-2-W4	1	October 26
Bat	NW33-5-16-W4	1	November 18
Skunk	NE23-6-5-W4	1	November 18
Skunk	Manyberries	1	December 5

TOTALS	SKUNKS	19
	BATS	8
	BOVINE	1
		28

ANIMAL HEALTH DIVISION